

Equipment and Instruments for Basic Oral Surgical Procedure

1. Incising soft tissue:

a) Scalpel (Handle and Blade)

The scalpel is used for making incision in oral surgical procedure; it's composed of a handle, on which many types of blades can be attached.

The most commonly used handle in oral surgery is bard – parker no.3 on the other hand, the blades are disposable and are of three types (no.11, 12 and 15) (Fig.1).

- Blade no.15:

The most commonly used and it is used for flaps and incisions on edentulous alveolar ridges.

- Blade no.12:

This blade is hook-shaped and used for making incision in gingival sulcus and areas posterior to teeth (e.g. maxillary tuberosity area).

- Blade no.11:

This blade is used for small incisions (e.g. incising abscesses).

The blade is inserted in the slot of the handle with the bevelled surfaces of blade and handle parallel to each other by using a needle holder. The scalpel is held in a pen grasp and the cutting edge is facing the soft tissue to be incised (Fig.1) (Fragiskos, 2007).



Figure 1 Left, Scalpel (Handle and blade). Right, Correct way to load the blade on the handle by the use of needle holder (Fragiskos, 2007)

b) Dissecting Scissors:

The dissecting scissors are blunt ended and are used for cutting tissues in deeper layers and for separating the mucosa from the underlying soft tissues (Fig.2) (Fragiskos, 2007).



Figure 2 Dissecting scissor (Porgel *et al.*, 2014)

2. Elevating the Mucoperiosteum by Periosteal elevators:

After the incision is made, the flap should be elevated from the bone. There are different types of periosteal elevators used for this purpose, having different tips. The most commonly used one in oral surgical procedure is Molt no.9.

Molt no.9 periosteal elevator has two ends. One is sharp pointed used for elevating the interdental papillae the other end is broad one used for elevating the mucoperiosteal flap from the underlying bone (Fig.3) (Hupp *et al.*, 2014).



Figure 3 Molt no.9 Periosteal elevator having pointed and broad ends (Hupp *et al.*, 2014)

3. Retracting Soft tissue:

The cheeks, tongue and flaps are needed to be retracted, in order to have better access and visibility to the surgical site. This is done by the help of different retractors.

a) Cheek and Flap Retractors: These include Austin retractor (Fig.4), Langenbeck rake retractor (Fig.5) and Minnesota offset retractor (Fig.6).

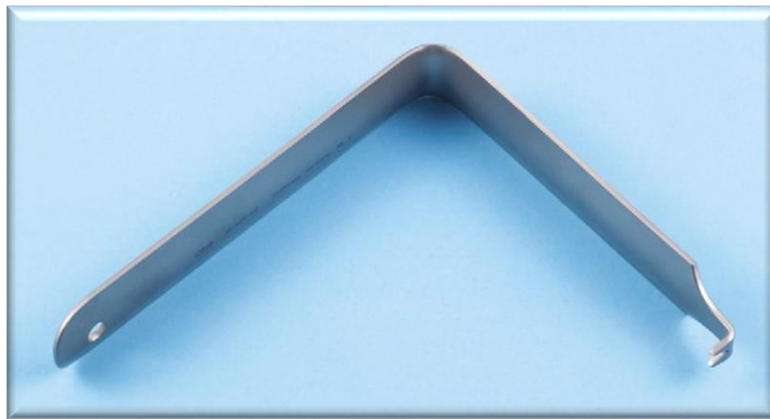


Figure 4 Austin right-angle retractor used for retracting cheek and flap (Hupp *et al.*, 2014)



Figure 5 Langenbeck rake retractor used for retracting cheek and flap (Fragiskos, 2007)

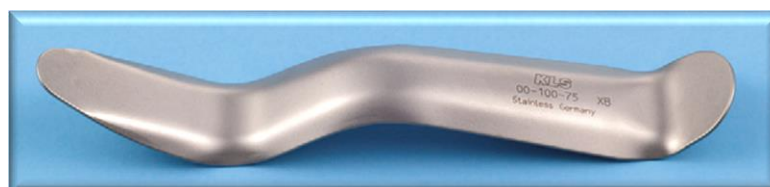


Figure 6 Minnesota offset retractor used for retracting cheek and flap (Hupp *et al.*, 2014)

b) Tongue Retractors: The most commonly used instrument for this purpose is the dental mirror, as well as, Weider retractor (Fig.7). In some cases, a towel clip can be used to hold the anterior part of the tongue during biopsy taking.



Figure 7 Weider retractor is a broad retractor designed for tongue retraction (Hupp *et al.*, 2104)

c) Flap Retractors: Following the elevation of the mucoperiosteal flap by periosteal elevators, it can be retracted by Seldin retractor(Fig.8) or by the same periosteal elevator Molt no.9.



Figure 8 Seldin flap retractor (Fragiskos, 2007)

4. Controlling Haemorrhages:

After the incisions have being placed, small arteries and veins will be incised causing them to bleed. This can be controlled by applying pressure to the area. However, bleeding from larger vessels cannot be controlled by means of pressure only. In this instance the haemorrhage can be stopped by a Haemostat, also known as Artery forceps. This instrument has different sizes and the beaks can be straight or curved, all having a locking handle. The most commonly used one in oral surgical procedure is the small and curved Mosquito artery forceps (Hupp *et al.*, 2014). After the Haemostat is clamped on the vessel the surgeon can either permanently stop the bleeding by passing a suture around the vessel (i.e. Ligation) or by the use of the electrosurgery unit which uses electrical power for haemostasis (i.e. Cauterization) (Fig.9)(Fragiskos, 2007).



Figure 9 Instruments and equipment for controlling haemorrhage. Left, Mosquito artery forceps. Right, Electrosurgical unit with various handpieces (Porgel *et al.*, 2014)(Fragiskos, 2007)

5. Removing Bone:

a) Surgical Handpiece and Bone Burs:

The surgical handpiece have high speed and torque, does not ejects air into the surgical field and it can receive many cutting instruments. The burs used for removal of bone are the round bur and fissure bur (Fig.10). A large bur similar of an acrylic bur is also available for reduction of large surface area (e.g. Tori) (Fragiskos, 2007).



Figure 10 Surgical handpiece and Different surgical burs (Fragiskos, 2007)

b) Rongeurs Forceps (Bone Nibblers):

This instrument is used for removal of bone by taking multiple bites. The end of the instrument is concave on the inner side of the instrument and may have slight angulation. The instrument can be either side cutting or side and end cutting. The handles have spring action, which restore the handles to their original position after being pressed (Fig.11) (Mitra, 2009).



Figure 11 Top, Bone rongeurs. Bottom, Close-up view showing side and end cutting tip (Hupp *et al.*, 2014).

c) Bone File:

This is two-sided instrument, having one small end and a larger second end. Both ends have many small parallel blades that work only with pulling motion (Fig.12). This instrument is used for smoothing the rough surfaces of bone (Mitra, 2009).



Figure 12 Top, Double ended bone file. Bottom, Teeth of the bone file (Fragiskos, 2007) (Hupp *et al.*, 2014)

d) Chisel and Mallet:

The mallet have heavy weighted end used to apply pressure on the chisel. It's a metal instrument; their end is covered with lead or plastic so that some of the shock is absorbed during its use.

The chisel is a sharp instrument having different shapes and sizes. The tip can be either bi-bevelled or mono-bevelled (Fig.13). The tip is placed on the bone and tapped by the mallet on its handle to allow bone removal (e.g. tori) (Fragiskos, 2007).



Figure 13 Surgical mallet and different chisels. a, mono-bevel tip. b, concave end. c, bi-bevel tip (Fragiskos, 2007).

e) Piezoelectric Bone Removal System:

This device utilizes high-frequency vibration for bone removal having less heat generated, more precise cutting and relatively safer to be used near vital structures (e.g. Maxillary sinus, Inferior dental nerve) (Fig.14) (Porgel *et al.*, 2014).



Figure 14 Piezoelectric bone removal system (Porgel *et al.*, 2014)

6. Removing soft tissue from bony cavities:

Sometimes during oral surgical procedure, the surgeon needs to remove granulomas or small cyst from the periapical area. This can be done with the help of special designed instrument called Curette. The curette used for oral surgical procedure is angled, double-ended and spoon-shaped instrument (Fig.15) (Hupp *et al.*, 2014).



Figure 15 The surgical curette (Hupp *et al.*, 2014).

7. Holding the Mouth Open:

The Dentist can keep the mouth opened and minimize stress on the TMJ by supporting the mandible using the following (Hupp *et al.*, 2014):

a) Bite Block: These are soft and rubber-like blocks, on which the patient can rest his/her teeth while keeping their mouth open. Different sizes are available for Adult and child patients (Fig.16).



Figure 16 Rubber bite blocks for adults and children. The side are corrugated to provide surface for teeth to engage (Hupp *et al.*, 2014)

b) Side-action Mouth Props: This instrument can keep the mouth open to a greater extent than the bite block and have a locking mechanism (Fig.17).



Figure 17 The side-action mouth prop (Hupp *et al.*, 2014)

These instruments can be used for prolonged procedures and when the patient cannot fully cooperate with the dentist (i.e. Sedated or having trismus) (Fragiskos, 2007).

8. Suctioning:

The blood, saliva and irrigation solution must be removed from the oral cavity, in order to have good visualization of the surgical field. The surgical suction have small diameter tip, allowing rapid evacuation of the fluids. In addition, some types have an extra hole on their handle allowing more control over the power of suction (i.e. When the hole is covered with the finger, more fluids will be removed) (Fig.18) (Hupp *et al.*, 2014).



Figure 18 a, Surgical suction tip with wire used as cleaning instrument. Note the hole on the handle which is used to control the power of suction. b, a disposable suction tip (Fragiskos, 2007).

9. Holding Towel and Drapes in Position:

When drapes are placed around the patient it can be held in place by Towel clip, which have pointed or blunt tip and a locking handle to secure it in place (Fig. 19) (Hupp *et al.*, 2014).



Figure 19 Towel clip with blunt tip

10. Irrigation:

When the surgical handpiece and bur is being used during bone cutting, it's of prime importance that the area is under continuous stream of sterile saline (i.e. Irrigation). The following are the main benefits of irrigation (Hupp et al., 2014):

- a) The irrigation cools down the bur and prevents bone damaging heat builds-up.
- b) The irrigation washes away bone chips from the bur, increasing the cutting efficiency.
- c) Provide some lubrication.
- d) Clean the surgical site before the mucoperiosteal flap is sutured back in place.

Irrigation can be done by mean of disposable plastic syringe or by special irrigation system connected to a bottle of saline solution (Fig.20) (Fragiskos, 2007).



Figure 20 a, special irrigation system. b, regular plastic syringe (Fragiskos, 2007)

References

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