

Part 3 - Surgical techniques for the AQB Implant system

Chapter 1 – Preparations required for implant treatment

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I. Preoperative checks

A. Communication points between the surgeon and the staff before the implant treatment

Implant treatment cannot be performed by the surgeon alone and requires cooperation by the paramedical staff. It would not be an exaggeration to say that the treatment outcome and the success operation process can be dependent on whether the role of each staff has been appointed or not. Therefore the team formation for the procedure should be planned out. Let us discuss what the ideal personnel arrangement would be.

The arrangement is highly dependent on the space available, but nevertheless an ideal would be to have two main personnel, a surgeon, and an assistant (another dental practitioner, or a dental hygienist), with a circulating nurse. The surgical course will be conducted more smoothly if the assistant has grasped the essence of implant installation from the basic techniques to those including the orientation of the installation (Fig. 3-1-1).

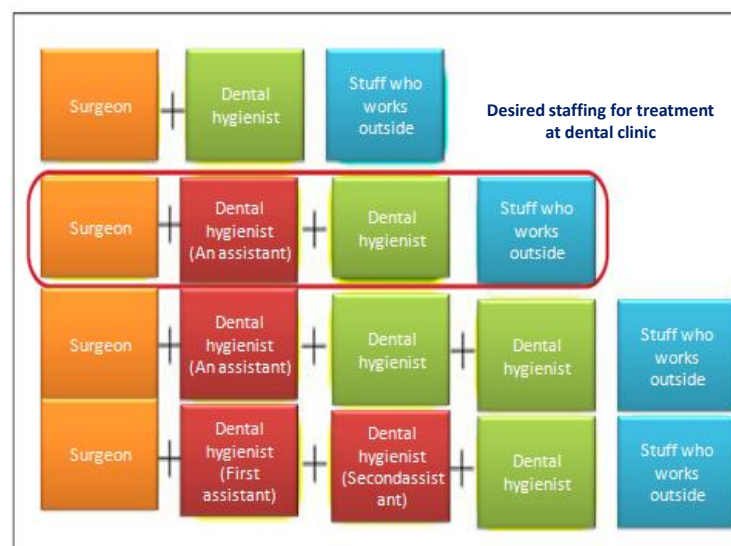


Fig. 3-1-1 Desired staffing for implant surgery

II. Apparatus required

A. Surgical tools required for the implant treatment

On contrary to popular belief as illustrated by the saying, “a good work man does not choose his tools”, the use of appropriate “tool” is essential for the implant surgery that involves intricacy.

1. Incision

The aim of applying the incision is to display the bone for the installation of implants. Therefore the

mucosa and the periosteum should be incised fully. The surgical scalpel that are in current use are No.11, No.12 and No.15 (Fig.3-1-3). Principally, the No. 15 is the most effective for the application of incision into the periosteum. The scalpel blades of No. 11 and 12 become distorted as it become in contact with the bone, therefore care is required.



Fig.3-1-2 Surgical apparatus necessary for implant surgery

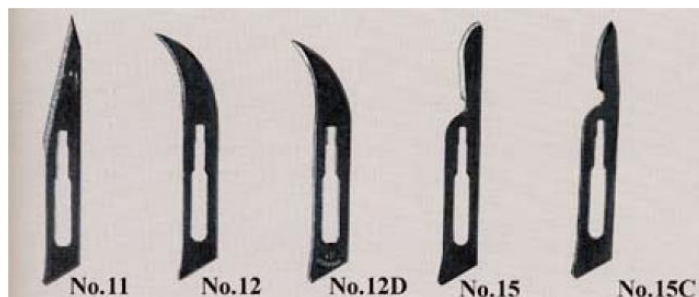


Fig.3-1-3 Scalpel No.11 is used to perform minute incision. Scalpel No.12 is curved and is suitable for incision of the periodontal ligament and the maxillary tuberosity region. Scalpel No.15 is used for general incision of the oral mucosa in addition to small skin incisions.

2. Detachment and elevation

Detachment and elevation are conducted to form mucoperiosteal flap, after incision. There are several raspatories that can be used (Fig.3-1-4). Forceps (tweezers) (Fig.3-1-5 to 7) and retractors (Fig.3-1-8) should also be prepared in case. The tips of forceps should be hooked or processed to be able to tightly hold on to the mucosa.



Fig.3-1-4

There are various types of periosteal elevator. Molt raspatory (top, Olas), Fine Raspa (middle, Olas), Dental periosteal elevator (bottom, YDM



Fig.3-1-5

McIndoe forceps

There is a toothed type and a non-toothed type. The toothed forceps is thought to be particularly effective for handling the mucosa.

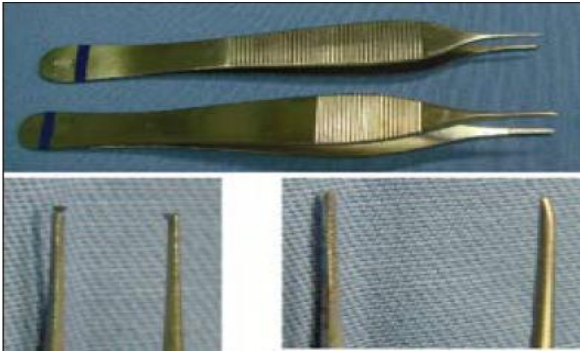


Fig.3-1-6

Adson forceps

There is a toothed type and a non-toothed type.

Its tip is thinner compared with that of McIndoe forceps and it is suitable for suturing the more intricate parts.

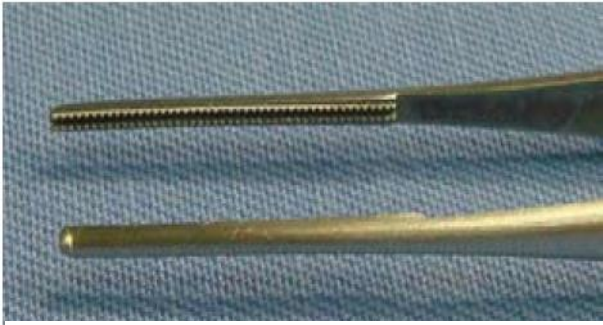


Fig.3-1-7

DeBakey forceps

Its appearance is almost the same as that of the McIndoe forceps. Lengthwise, it has three grooves with fine grooves on its width to enable atraumatic suturing. Forceps of 15 cm length is convenient for use in the oral cavity.



Fig.3-1-8

Langenbeck retractor (Olas)

This is used to retract the flap or the lips. It is very useful to retract the flap using the toothed section but this should be conducted carefully as too much traction can lead to further detachment of the flap than planned.

3. Suture

Suturing is required after the implant installation. Since some require modification of the state of the gingivae, a pair of scissors for gingivae preparation should also be equipped. For the actual suture, needle holder, forceps, suture thread, and suture needle, one of each should be prepared. Needle holder, suture thread and suture needle that are to be inserted into the oral cavity, should in sizes that can be placed in the mouth. Personally, I usually employ Hegar needle holder of 15 cm length (Fig. 3-1-10), and 4-0 silk suture thread, and tapered needle to minimize damages to the mucoperiosteal flap (Fig.3-1-11). (Refer to "Part 3 Chapter 2 IX suture" for further details).



Fig.3-1-9 Scissors specific for gingivae

Curved scissors are easier to use than the straight ones for gingivae preparations



Fig.3-1-10

Hegar needle holder (with a chip, 15 cm)

Needle holders are available on the market in various sizes. Choose one that fits into the oral cavity.



Fig.3-1-11

4-0 silk suture thread and taper needle (Point of caution, a taper needle loses its sharpness earlier than a cutting needle) (Left). Synthetic absorbable suture thread (Right).

B. Surgical apparatus specific for the AQB Implant system

The procedures following the incision and detachment require the tools for AQB Implant system. The apparatuses are being sold by Advance Co., Ltd (Fig.3-1-12). There are various options within this tool set that enable safe and reliable procedures to be conducted.

- ① Round bar: It is used for marking the position of the implant placement and to stabilize the guide drill when it is being used.
- ② Guide drill: It is employed to determine the position and orientation of the implant placement and the depth of implant cavity.
- ③ Direction checker: It is use for confirming the position and the orientation of the planting hole and clearance with opposing teeth.
- ④ Spiral drill: It is used to expand the implant cavity to match the diameter of the implant.
- ⑤ Counter drill: It is used to prevent the repositioning during the step-up expansion of the implant cavity.
- ⑥ End-mill reamer/ reaming drill: It is used for expansion of the implant cavity.
- ⑦ Alarm gauge: It is used to confirm the depth, the diameter, and the orientation of the planting cavity.
- ⑧ Reamer: It is used for the expansion of the planning cavity in the axial direction.
- ⑨ Circular knife: It is used to trim the gingivae to match the implant body circumference.
- ⑩ Fixer, free wrench, and fixer support: Tools used for the implant placement.
- ⑪ Implant (fixture) (Fig.3-1-13): One-piece, two-piece, and one-piece T-type are available.

- ⑫ Abutment/ other (Fig.3-1-13): A variety of abutments are available for two-piece type, e.g. straight abutment and healing abutment.

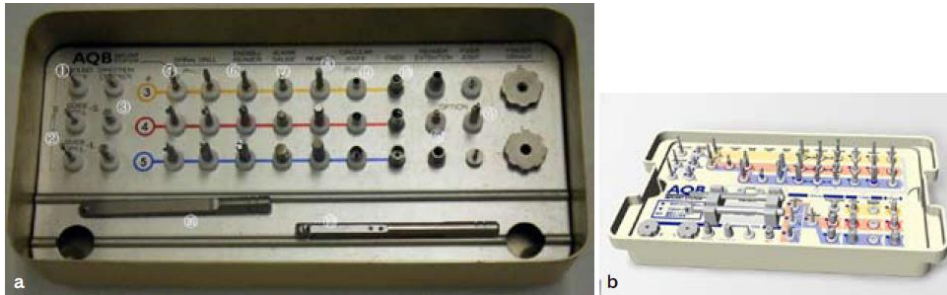


Fig. 3-1-12-a,b

A set of the AQB Implant tools

(a. the former one, b. the 2009 version-image)

It is lined from the left hand side in the order that it would be used, and the color coding indicates for use in each implant type.



One-piece type

One piece T-type

Two-piece type

Fig.3-1-13

The selection of AQB Implants – two kinds of one-piece type, 1 two-piece type, and three kinds of implants are available in total.

III. Disinfection and sterilization

A. Clean area and unclean area

A higher standard of clinical hygiene are required for implant treatment than with the general dental treatments such as tooth extraction and other periodontal surgical procedures.¹⁾ This is essential to be considered for a safe and accurate placement of the implant. An implant treatment is one that places a foreign object into the jaw bone, thus more strict precaution is required than any other dental procedures. Within the surgical facility, there are clean and unclean areas. The clean area is created in the enclosed space within the drape (Fig.3-1-14) and sterile apparatus can be placed here.

There are only a limited number of methods that can create the clean section in different facilities. The clean sections in the surgical room in a hospital, in the outpatient surgical setting, and in the general practice settings, cannot be subjected to comparison, however, it is necessary to achieve the highest level of hygiene that is possible with the given facility.

Fundamentally, the only staff allowed to enter the clean area should be those who are in sterilized gown and sterilized gloves (Fig.3-1-18). If the gown is not worn, the sterile area that become in contact with the body, expect the part covered by the gloves, becomes soiled therefore this should be avoided.



Fig.3-1-14

Drape (left: a drape, right: a drape with a hole)
It is disposal and has been sterilized beforehand.



Fig.3-1-15

Operating room of a hospital

At the operating room level, a clean area is wide and secured with a drape. The instrument table has been secured with enough clean area.



Fig.3-1-16

Outpatient operating room

A clean area is secured by a drape with a hole. The clean section is a minimum because it is an outpatient operating room.



Fig.3-1-17

Implant surgery in a general clinic

The clean area is within a drape with a hole and the instrument table.

The clean area is easy to change into an unclean area since the patient is not wearing a sterilized gown. The surgery therefore needs to be performed with great caution.



Fig.3-1-18 Gown technique (A person wearing sterilized gloves and a surgical gown)

Sterilization is a term referring to any of the process that eliminates or kills microbes such as pathogenic/ noxious bacteria or viruses.²⁾ Elimination methods utilizing temperature, pressure and pharmacological actions have been employed widely with autoclave (Fig. 3-1-19), or ethylene gas. The apparatus undergoing sterilization procedure should be placed within the sterilization bag (Fig. 3-1-20). The removal of the sterilized tools from the bag should only be done with those wearing the sterile gloves.

Disinfection, on the other hand, is referred to as destroying causative microorganisms to prevent the spread of infection, but does not necessarily kill all of the microorganisms. The disinfectant is used on the surgical surfaces (Fig. 3-1-21), and for the disinfection of the hands before their placement into the sterilized gloves (Fig. 3-1-22). The use of chlorhexidine has been contraindicated in the oral cavity therefore benzalkonium chloride or povidone iodine is used instead.

To disinfect the finger tips, 4% chlorhexidine, or povidone iodine are used.



Fig.3-1-19
Autoclave



Fig.3-1-20
Instruments in sterilization bag



Fig.3-1-21
Disinfection of operative field



Fig.3-1-22-a,b

Hand disinfection before wearing groves (a)

Automatic pump (available as a sensor type or a foot-pump type) (b) is effective as the disinfection of the finger tips can be done without becoming in contact with the unclean areas.



Fig.3-1-23 Hibiscrub® (left) and isodine scrub® (right).

IV. Preoperative care of the patient

Any inexperienced surgeons would be tense before an implant surgery, however it should not be forgotten that the patients are feeling more nervousness than you are. Extreme tension is likely to be felt in patients who are unfamiliar with the dental treatment, or have had traumatic experiences during the previous treatments therefore it is important for the surgeons to show their concern.

It is important to note that the surgery conducted under extreme tension can lead to primary shock due to pain, or hyperventilation. For those suffering from extreme cases of tension, administration of Nitrous oxide or Nitrogen oxide inhalations have often been effective.

References

- 1) Koga T. Implant surgery, Basic. Tokyo. Quintessence Publishing Co., Ltd. 2007; 2-5. (in Japanese)
- 2) Katsuki T, Uchida Y. Basis of surgery and surgical anatomy for implant/oral surgery. Tokyo. Quintessence Publishing Co., Ltd. 2007; 12-15. (in Japanese)
- 3) Seto K, Fukuda J, Furuta I, Kurita K, Noma H, Asanami S. Hand manual of oral surgery '08. Tokyo. Quintessence Publishing Co., Ltd. 2008; 161-165. (in Japanese)