

Chapter 4

What is implant?

For the person who hear the word 'implant' for the first time.

Question 1

We can find various kinds of implants on the internet, but they all get lumped together as 'implant.'

Can you tell me the sorts of implants and their merits and demerits?

Answer 1

(1) What is implant?

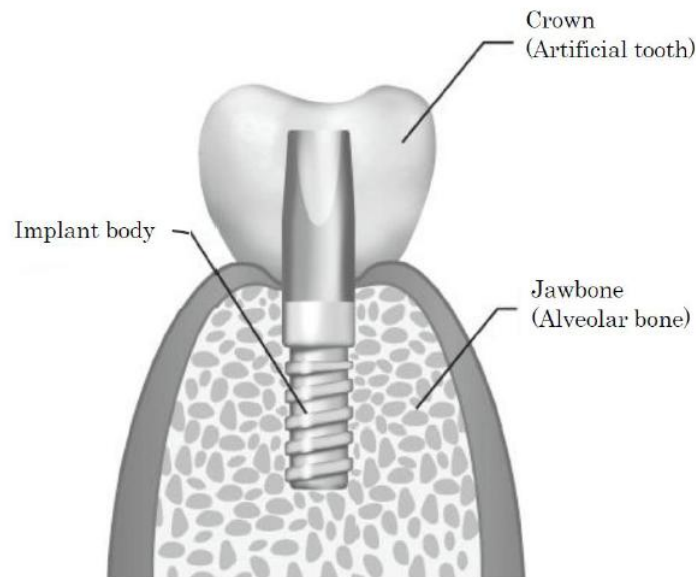
An implant is an artificial tooth root.

We make a hole with a specialized drill in the jawbone (bone of the jaw) of the extracted cavity and place an artifact (implant) which has the same figure as a tooth in order to supplement function of the lost tooth.

The implant is composed of implant body and prosthesis (a cap called a crown).

Fig.9

Structure of an implant



The implant body is installed into the jawbone and the crown is placed on the implant body like a hat. The crown takes charge of occlusion and it has the role of chewing, grinding, and cutting food.

Moreover, it also has important role in utterance such as speaking and singing.

Needless to say, the crown is also important in terms of aesthetics, 'beautiful dentition', as same as natural teeth.

The crown of an implant is similar to a natural tooth and it is completed beautifully, therefore it is possible to laugh with your mouth wide open and your smile will get even more beautiful.

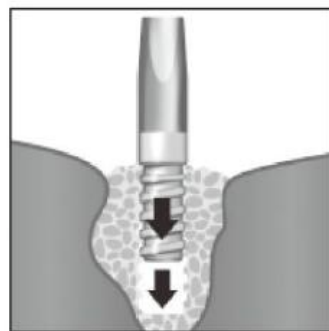
The implant body should be fixed into the jawbone well in order to play these roles.

It is required to have enough strength to withstand 80 kg of force per tooth.

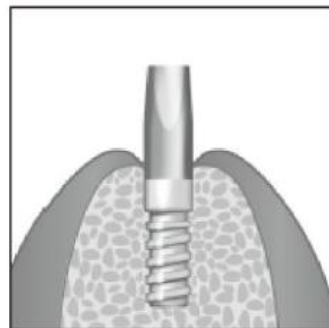
Therefore, to integrate implant body with the bone as AQB implants is very important.

Fig.10

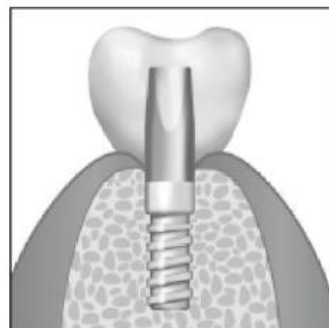
Flow of implant treatment



① Place an implant body into the alveolar bone



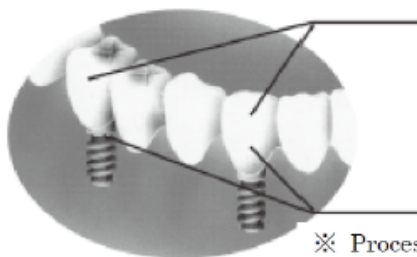
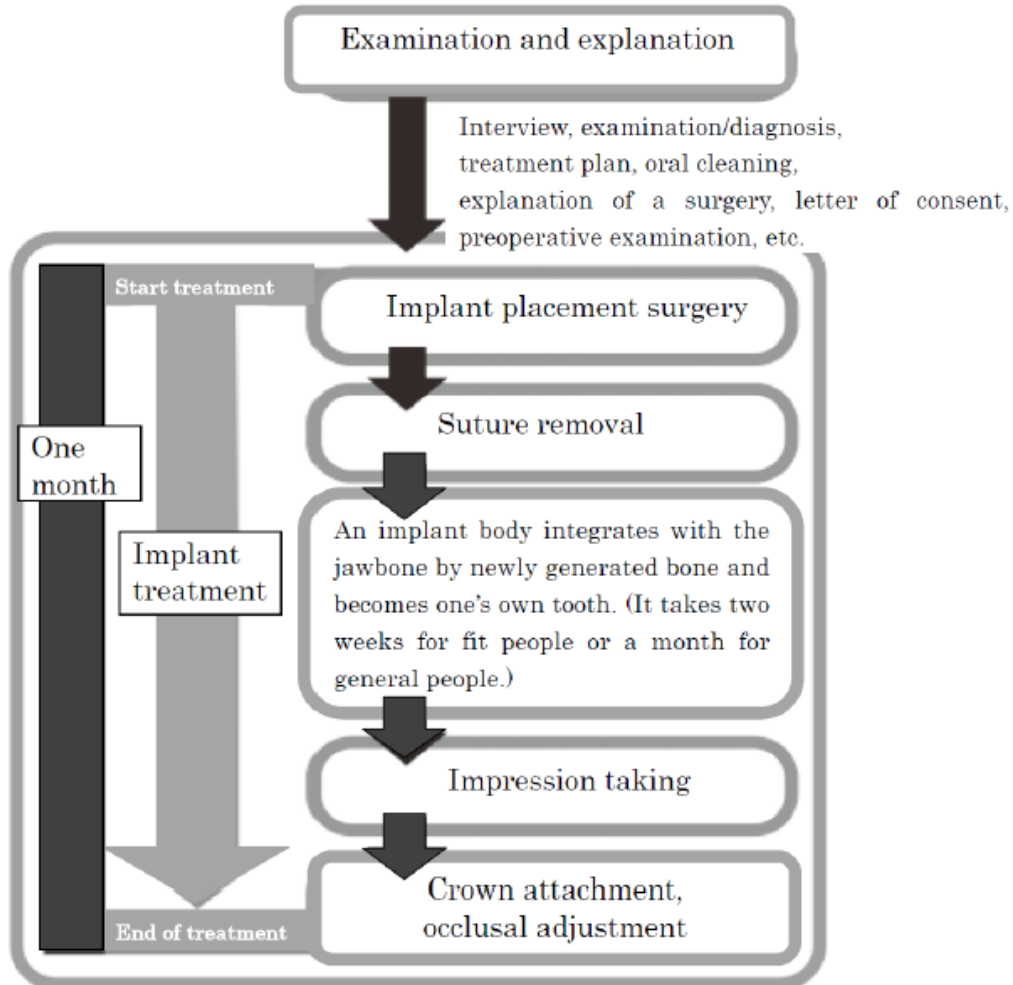
② The implant body takes two weeks for fit people or a month for general people to integrate with the alveolar bone.



③ Attach a crown to an abutment.

Fig.11

Basic flow of implant treatment



This white part is a 'crown'.

This metal part is an 'implant.'

※ Process would change depend on the case.

(2) Implants can be classified into some groups by their materials, manufacturing methods or forms. However, I will explain implants by dividing into three groups from their historical progress this time.

Classification by historical progress

① Bioinert stage

Historically, it is the first stage of implant.

② Bioactive stage

Historically, it is the second stage of implant.

③ Bio affinity power stage

Historically, the one month implant is the third stage implant and it is completely new osseointegration implant.

(3) Classification by form (or method)

① One piece (which is also called one stage implant)

The implant body is consists of one part.

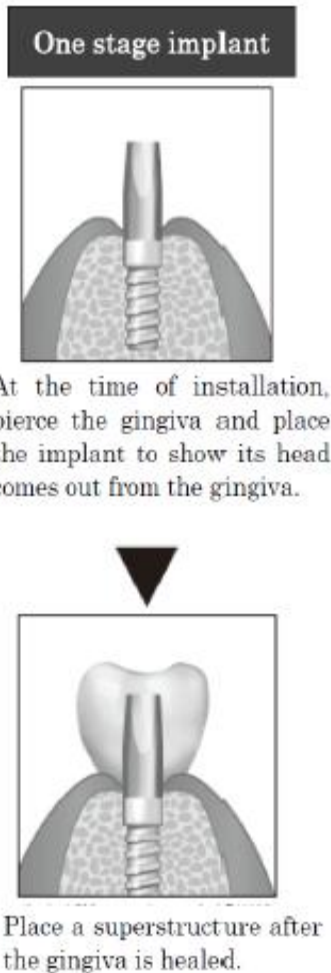
One piece requires only one time of gingival incision, therefore burden on patients will be reduced.

② Two piece (which is also called two stage implant)

The implant body consists of two parts.

Regarding two piece implant, there are some cases where two times of gingival incision is required.

Fig.12-1 One stage

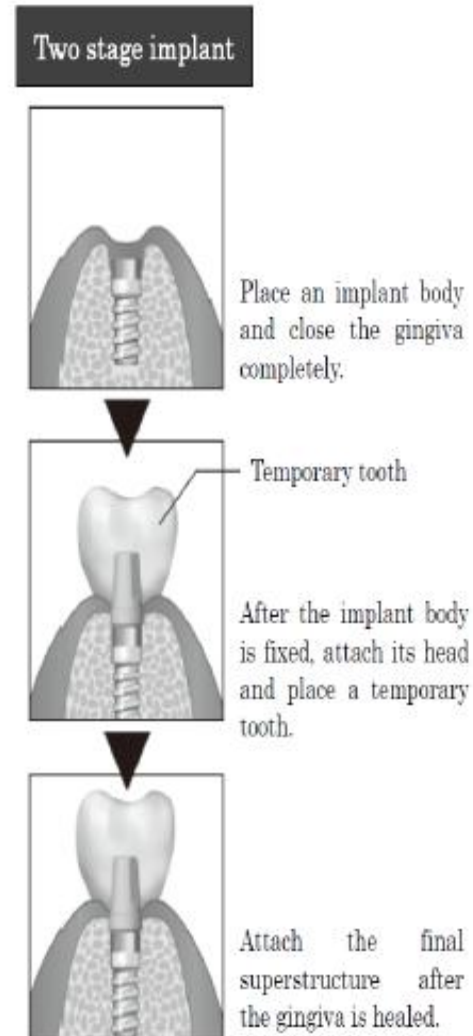


One stage implant requires only one surgery.

Regarding AQB, burden on patients is greatly lightened because the implant body is fixed to the bone in a short term and becomes one's own tooth.

Also, the degree of sealing is high, therefore there is no need to worry about bacterial infection.

Fig.12-2 Two stage



Two stage implant is buried completely into the gingiva, consequently there is no need to worry about bacterial infection. It does not receive force during healing period therefore burden on patient is lightened.

However, it requires two surgeries.

Question 2

Are there various kinds of implant surgeries?

Answer 2

(1) There are some surgical methods according to the condition of oral.

(2) Firstly, the surgical method is decided by comprehending condition of the jawbone(alveolar bone[※]) since implant is placed on the jawbone.

Usually, implant is placed as it is if jawbone has enough thickness, height, and hardness, in a word, if jawbone is healthy.

(3) If the jawbone is insufficient to install an implant, for example, the jawbone is thin or not high and hard enough, the 'hyperostosis[※]', which is a surgery to increase bone, will be performed.

There are many kinds of hyperostosis such as bone grafting, guided bone regeneration method (GBR), alveolar distraction osteogenesis, and regenerative therapy.

Any of them are not difficult and generally performed by dentists who are specialized in implants.

(4) Kinds of hyperostosis can be summed up as follows.

① Bone grafting –Autograft-

This is the method to use patient's bone in order to increase the jawbone. Crushed bone which is gathered from one part of the body except for the oral (such as the ilium or shindone) is used.

In addition to an implant surgery, a minor surgery is required to gather bone.

② GBR (Guided bone regeneration method) –Autograft or artificial bone-

The way to use crushed bone (autograft) that gathered from the oral (such as maxillary and mandibular processes, mental region) and the way to increase the jawbone using powder or granules of artificial materials which is as same as bone component (such as HA: hydroxyapatite).

There are some cases where the GBR is performed at the same time of the implant surgery.

③ Alveolar distraction osteogenesis

This does not require bone grafting but distraction of gingiva (soft tissues) besides bone is possible.

It is the way to plant a special device into a part where need to be distracted horizontally and vertically to widen and extend the jawbone directly.

Therefore, a surgery to plant the special device into the jawbone is necessary.

In this case, the implant surgery will be performed after the jawbone hyperplasia therapy is finished.

④ Regenerative therapy

It is the way of bone regeneration to work on the affected part of the body directly by using various differentiation/growth factors which control forming of bone tissues in the body.

Products such as 'bone morphogenetic protein (BMP)', 'fibroblast growth factor (FGF)' and 'enamel matrix derivative (EMD)' are mainly used as a growth factor at present. However, except for EMD GEL, they are not approved by the Pharmaceutical Affairs Law in Japan.

(5) In cases where an implant is installed into the maxillary molar region, necessary bone quantity is not enough at times.

In such cases, the method of lifting and expanding patient's bone by using special technique is performed.

In general, it is the way to detach and elevate the schneiderian membrane of jawbone cavities that is called maxillary sinus and to place an implant to the space between cortical bone of the maxillary sinus floor.

This is also called 'maxillary sinus floor elevation procedure' and there are two kinds of methods.

According to quantity of bone which is elevated, the procedure is divided into 'socket lift procedure' and 'sinus lift procedure'.

① Socket lift procedure

In general, this method is applied to cases where height of remained bone is more than five mm.

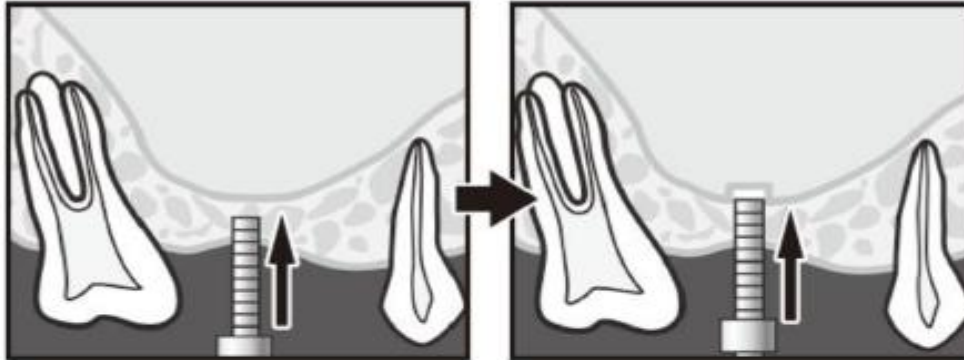
At this time, the maxillary sinus membrane is detached and elevated by malleting with a special apparatus which is called osteotome.

It is widely applied in clinical practice as an easy maxillary sinus floor elevation procedure because it gives a little surgical stress to a patient.

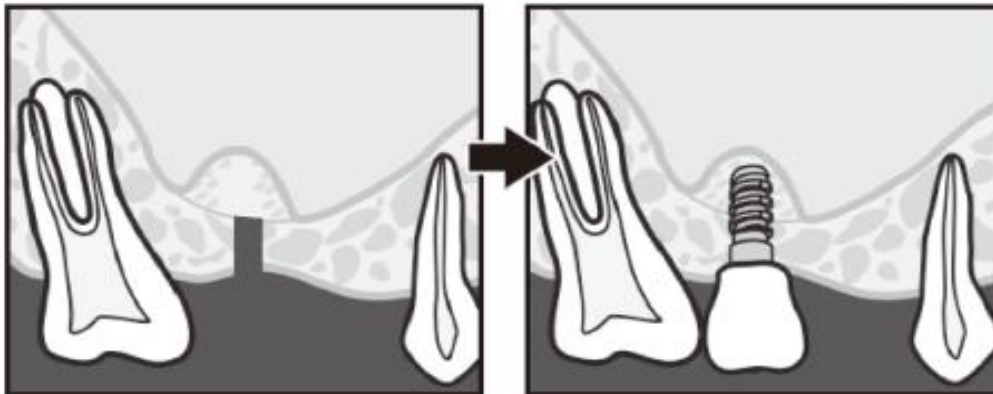
It is possible to place an implant at the same time.

Fig.13

The socket-lift procedure



- ① Pre-surgical examination (The applicable case is one that requires less than 3 mm of bone augmentation.)
- ② Insertion of AQB implant (4 mm diameter). Drill a hole with the guided-drill (1.8 mm diameter) and leave about 1 mm of bone quantity from the maxillary sinus floor.
- ③ Form with spiral drill (2.5 mm diameter) and leave about 1 mm of bone quantity from the maxillary sinus floor.
- ④ Mallet with osteotome (2.8 mm diameter) to cause greenstick fracture on the sinus floor. The malleting sound changes from a clear to dull sound when greenstick fracture happens. Stop malleting at this time.



- ⑤ Malleting with osteotomes (3.5 mm diameter).
- ⑥ Fill the socket with the graft material and then mallet with osteotome (3.5 mm diameter). The grafted bone has role to acts as the cushion for the implants at the time of malleting.
- ⑦ Insertion of implant. If the implant is difficult to install, form the hole with end-mill reamer (leave 1 mm of bone quantity from the maxillary sinus).

② Sinus lift procedure

This method is applied to cases where height of remained bone is less than five mm.

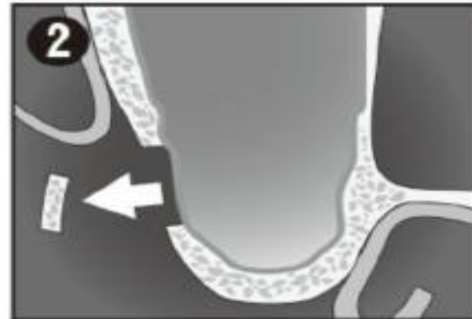
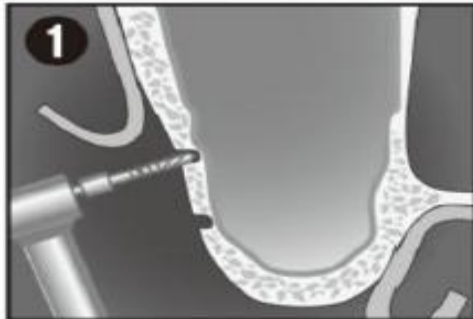
It is the way to make a hole in the lateral wall of the maxillary sinus to perform bone grafting and to detach and elevate the maxillary sinus membrane.

It gives large surgical stress to a patient but has merit that is able to perform a surgery certainly under a direct vision.

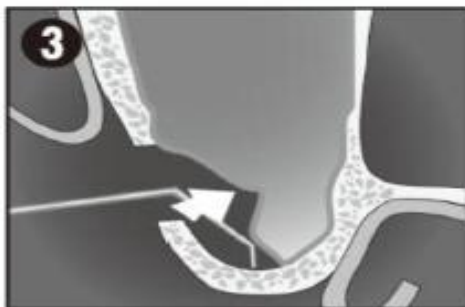
Depends on the quantity of elevation, an implant is placed at the same time with this method or after healing the wound.

Fig.14

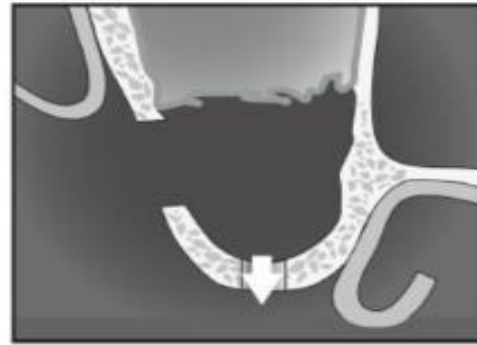
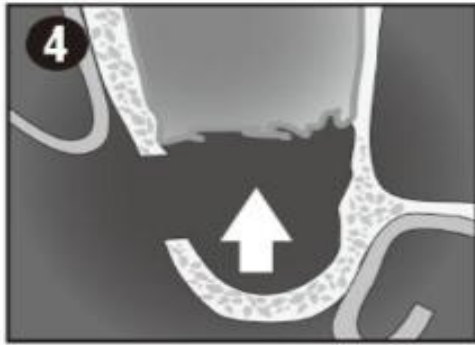
The sinus-lift procedure



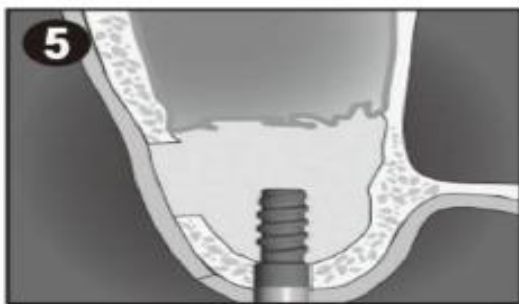
- ① Ensure that there is no presence of pathogenic conditions (inflammation, cyst, swelling) in the maxillary sinus with CT. It is also essential to visualize in three-dimensions of the state of maxillary sinus to determine where to incise on lateral wall of the maxillary sinus and elevation area of mucosa
- ② With regards to the incision line, the horizontal incision should be applied in the position where the bone window can be completely covered and stitched up with the mucoperiosteal flap, and the longitudinal incision should be drawn to the area proximate to the gingivobuccal fold for the exposure of the bone of lateral wall of the maxillary sinus.



- ③ The formation of the bone window on the lateral wall of the maxillary sinus should be formed basically at the 3 mm above from the lowest part of maxillary sinus and form a whole under physiological saline solution with a round bur or a diamond bur. Pay great caution to not damage the schneiderian membrane.



The schneiderian membrane should be carefully detached from the edge of under the bone window and lateral edge with raspatory for maxillary sinus mucosa. The raspatory should be selected based on the shape of the maxillary sinus, and should be detached in line with the bone. This detached schneiderian membrane should be tucked into the maxillary sinus in a hinge-like manner. Secure a sufficient amount of space to fill with the graft material. If the membrane can be fully detached without any complications such as perforations, then the movement of the membrane in accordance with nasal respiration can be observed.



- ⑤ Drill while making sure where the implant installation site is and securing the schneiderian membrane. After the drilling, fill bone graft ingredients up to the maxillary sinus and install two piece implant. After installing the implant, fill bone graft ingredients up again and cover the window that has been opened with absorbable membrane, and close the wound by stitching.

Question 3

Can anybody receive implant treatment if they want?

For example, I have heard that implant placement will be impossible if patient's jawbone is hollow because of his/her illness.

Is that true?

Answer 3

(1) Regarding AQB implant, it has the function of osteoinduction, therefore it can be widely applied to patients' various oral conditions.

However, implant treatment should be custom-made because patients' oral conditions are completely different.

The reasonable treatment plan will be made after the careful individual meetings to fit the patient and his/her oral condition.

A clinical policy and surgical method is decided to fit the patient's condition considering if he/she is healthy or suffering from diseases such as high blood pressure, heart disease or osteoporosis, etc. Moreover, thickness, length and number of implants, surgical method and if necessary, hyperostosis is chosen according to condition of the patient's jawbone, and then an implant treatment will be performed.

(2) If a patient has serious disease, implant treatment should be avoided.

Question 4

I have been affected with chronic diabetes mellitus for 30 years.

This doctor said to me that implant treatment would be difficult because my bone was thin.

He also said that implant treatment would likely to be fail because diabetics have low bone density.

Do you think that 'one month implant' can be performed under this condition?

Answer 4

Your bone is certainly thin and bone density is low, however you can have 3 mm of implant, therefore you are fine.

In addition, low bone density is not a problem because the one month implant has bio affinity power.

However, in regard to healthy people, usually the implant will be taken in the jawbone owing to the bio affinity power therefore he/she will be able to start to eat in a month.

However, you will need to take a little more time.

Nevertheless, the implant will become your own tooth in two months and you will be able to eat.

Depends on the condition of patient's illness, the implant might takes two months when it usually takes about a month, but it will not take four or five months as other implants take.