Part 2 - Before implant treatment

Chapter 1- In-hospital system necessary for implant treatments

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I. Surgical environment

A. Preparation of surgical environment

1. Preparation of operation room

It is usual to find no sterile facilities in a private clinic that can be found in the general hospital. It is preferable to conduct implant treatments in a separated sterile unit nevertheless it is not realistic to prepare a strict sterile environment. It is still possible to perform implant surgery under the ideal settlings if it is possible to install air purifier or extraoral vacuum. (Fig. 2-1-1).

The operating table of the dental unit is often found that the aspirator and the three-way syringes are fixed to the structure which can be difficult be well handled. The operating environment is preferred to be as wide as possible for the few assistants, implanters as well as the space required to place the surgical tools. The smaller the space, the less efficient the procedure becomes, leading to lengthening of the operation time than required.

Fig. 2-11 Extra-oral vacuum

2. Environment of the surgical room and securing visual aids

The visual aids are essential tools, under the surgical settings, in order to maximize the view for the operation. With inefficient lighting, the surgical procedures can become complicated even for the experienced surgeons. This does not necessarily just apply to the implant treatment, but also for other surgical procedures.

The implant treatment is usually conducted with a multiple personnel. The oral cavity is a particularly a small operating area therefore heads and hands or even the aids to help to maximize the view can obstruct the view possible. In order to overcome this issue, it is recommended to use a combination of dental astral lamp and surgical astral lamp (Fig.2-1-2). Alternatively, the use of head lamps could be effective since these are not going to be obstructed by the head.

The provision of light is not the only factor required to enable clear visual field. Since this is a invasive

surgery, use of aspiration techniques to remove the blood and saliva are also vital. For a smooth aspiration, a well experienced assistant with a full understanding of the surgical procedure is necessary. The clarity of vision can become dependent on the flap design and flap formation, with in turn are affected by the incision and elevation techniques, therefore the surgical planning have to be conducted in detail before starting the surgical procedures (Fig. 2-1-4). An inadequate flap formation can complicate the retraction by the assistants, as well as the aspiration, therefore the full planning beforehand is highly recommended.

Fig.2-1-2 Surgical astral lamp

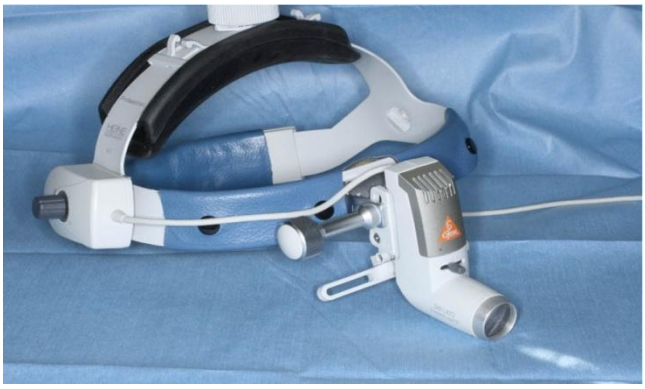


Fig.2-1-3 Headlight

1. Secure sufficient amount of light
2. Secure as much space as possible
3. Secure surgical space with sufficient retraction
4. Control the amount of bleeding and saliva

Fig.2-1-4 Basic matters to secure a visual field

B. Preparation of surgical tools

1. Implantor (Fig 2-1-5)

Implantor is a apparatus that is essential in implant treatment. It is also a precision instrument therefore a preoperative check cannot be neglected. Principally, the preoperative check should be done to confirm its infusion functions and that there are no abnormalities in their motor revolutions.

2. AQB tool set (Fig. 2-1-6)

The surfaces of the new tools are covered in machine oil, which must be completely removed prior to their sterilization. In the failure of this, the use of the tools with the oil still remaining can subsequently result in inefficient biding of the implant body with the bone. It is also vital to avoid the tools getting in contact with each other during ultrasonic cleaning (Fig. 2-1-7).

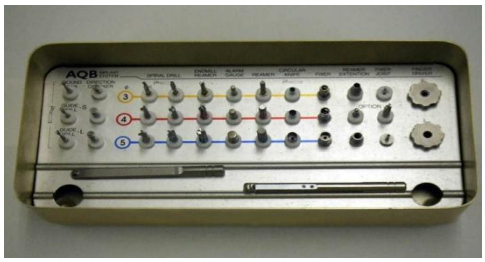
After the operation, rinse the tools with water to remove the attached bone fragments then perform ultrasonic cleaning with anti-rust agent. In storing the tools, after the cleaning with the anti-rust agent, store the tools with the cleaning agent still remaining on the surface under dry conditions. The anti-rust agent coating acts to protect the tools from becoming oxidized (Fig.2-1-8).

The tools under storage should be rinsed with water in order to remove the anti-rust agent coating the surface, before use. These can affect the bonding of the implant body with the bone if left on the surface, in the similar manner as with the machine oil remaining (Fig.2-1-9).

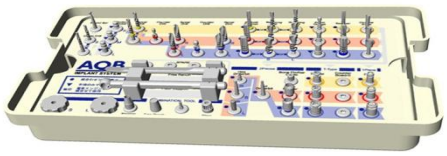
3. Surgical tool kit (Fig. 2-1-10)

The surgical tools also require the same management system as the implant tools, with the application of anti-rust agents.

Fig. 2-1-5 implanter



a



b

Fig 2-1-6 AQB implant tools set (a: former set, b: image of 2009 version)

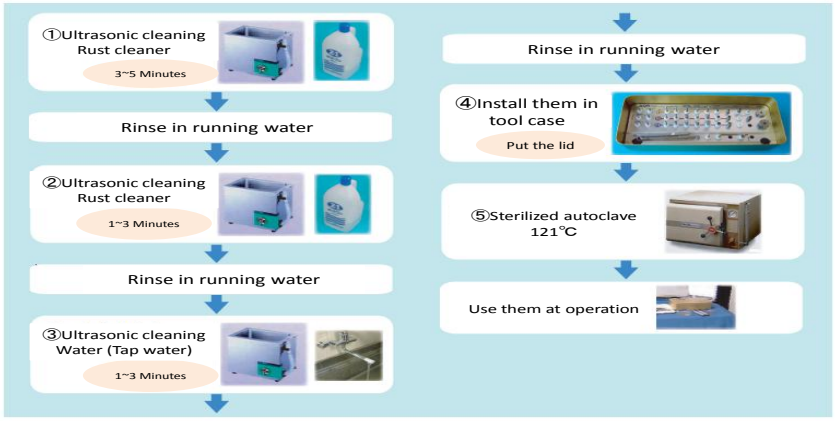


Fig. 2-1-7 Cleaning and sterilization for brand new tools

Fig. 2-1-8 Cleaning and storage after operation

Fig. 2-1-9 Cleaning and sterilization after first time use

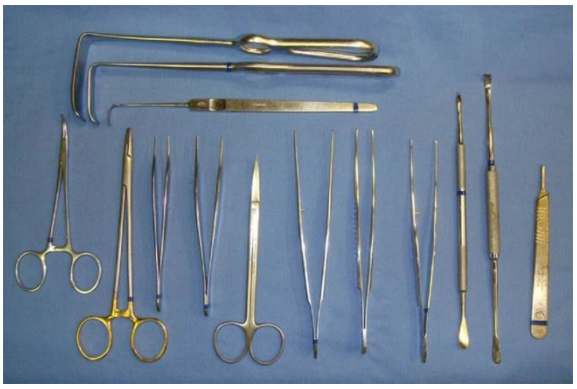


Fig. 2-1-10 Surgical instrument sets

II. Staff training and patient management

A. Staff training (Fig.2-1-11)

The implant treatments are fundamentally conducted in a team of professionals. Its success can be said to weigh heavily on the performance of each of the individuals. For the type of oral surgery setting that requires general anesthesia, the surgery is conducted in such a way that there is a central team of professionals consisting of: a surgeon, a first assistant, a second assistant, and a scrub nurse, usually wearing a sterilized gown. In the exterior of this team, there is a circulating nurse who provides with the apparatus that became necessary during the surgical procedures (Fig. 2-1-12). The first assistant holds the key to a smooth operation, therefore this professional should be well informed of the surgical procedure, and a smoothness and safety of the surgery can be achieved by him/her acting as the navigator for the surgeon.

How to train the staff:

1. Consulting the patients: pre- and post-treatment
2. Knowledge and practice of sterility and disinfection
3. Preparation, management and check of the surgical apparatus and tools
4. Perioperative assistance
    1) Lighting aid for the surgical field
    2) Displacement of lips, tongue, and cheeks: use of tongue depressor, and a retractor.
    3) Use of aspirator
    4) The steps of surgical procedure, and handing out the surgical tools
    5) Assistance at the time of suture
5. Emergency measures
    1) Management and preparation of emergency apparatus and medication
    2) Positioning of the patient at the time of emergency
    3) Measuring the vital signs (pulse, respiration, blood pressure, body temperature).
    4) Conduct oxygen aspiration
6. Waste disposal

Fig. 2-1-11
Staff training

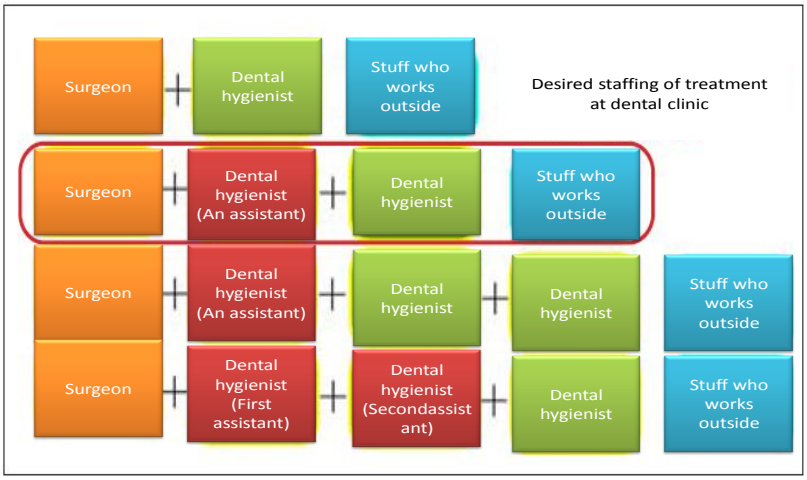


Fig.2-1-12

Personnel setup in a surgery

If there is sufficient amount of space, then the more number of personnel, the better, but it is a fundamental requirement to train capable co-dental staffs in order to carry out a smooth operation.

B. Informed consent

There has been a recent rise in the level of recognition of implant treatment, with the subsequent increase in demand, it is no exaggeration to say that it become a public general knowledge. Alongside this increased demand and the increase in the number of cases, the failure examples and litigations have also been increasing at an accelerating pace. Since it is conducted under a local anesthetic conditions, some practitioners consider the implant treatment to be merely a part of the general dental treatment. However, if the need for patient communication is neglected, the slight misconduct, or any discrepancy can lead to psychological or physiological stress for the patient. The implant treatment can have a profound effect and the patients will be appreciative if the treatment succeeds, but in the case of failure, the patient will suffer greatly. For this reason, the complete treatment plan encompassing the therapeutic approach, duration of treatment, predictability, risks, and treatment cost should be well informed for the patient to understand to obtain their agreement. This has been referred to as informed consent whereby the medical practitioner has the duty to explain to the patient of the procedures that will be taken, and gain agreement for this before the treatment". It has become a fundamental rule in the medical conduct in Japan. The practice of informed consent has been put in place to promote the communication of the patient and the practitioner, and with the aim to implement a medical practice that is in agreement with the patient. The sign in the consent form should be the result of this conduct, and not the aim. The general informed consent has been noted below:

1. The medical practices that requires informed consent

With respect to the general medical care, this includes medical practices that involve risks to "an extent", in other words cases that involve surgical invasion.

2. Factors required for the informed consent

The following four requirements are necessary to be fulfilled for the success of informed consent.

a. Capability of giving consent

There are often cases whereby it is difficult to judge whether the individuals, particularly with the elderly patients, are capable of giving consent. In such cases, it is vital to record the process in the presence of the relatives of the patient or other professionals.

b. Explanation (Disclosure of information)

Disclose as much information as possible regarding: name and condition of present disease; purpose, content, necessity, and effectiveness of the medical treatment; the risk and frequency (probability) of its occurrence; alternative treatments and their risk; risks that may occur if no treatment is performed.

c. Understanding of the contents

In order to gain essential agreement, it is imperative for the patient to fully understand the explanation. Therefore the practitioner must choose appropriate wording that can be easily understood and take certain amount of time to explain. Explanation in simple sentenses with use of diagrams could be effective to help patient understanding.

d. Agreement

Under the general medical practice settings, "voluntary agreement" (decision made by the free will of the individual) is necessary, and this cannot be a result of forced consent.

3. The informed consent form

An informed consent form has an important meaning for both the patient and the medical practitioner. The extent of understanding of the contents of their care will be increased with the explanation in the written form. For this reason, the explanation should be written down in a simple form with diagrams. This is also effective for the medical practitioner to act as the guideline to avoid any misses in giving out the necessary information, thus avoid the dispute as to whether the explanation was appropriate at later date ("I have explained…, I have never heard…").

This also applies to implant treatment when explaining to patients without any specialized medical knowledge, the information regarding: disease condition, necessary examinations, preferred treatment and its associated risks, presence of other treatments with their advantages and disadvantages should be given in the form that can be best understood by the patient. It is necessary to provide accurate information to the patient by conducting detailed analysis including: comparisons between implant, bridge and denture; prognosis based on evidence-based medicine (EBM); aesthetic recovery; and oral hygiene. Having confirmed patient understanding, this conversation should be written down in their medical records. The informed consent was not intended as a confrontational tool simply for the patient to claim their right or for the medical practitioner to evade their responsibility. It should be used as a tool with the intention of improving the medical care settings.

C. Patient management

1. Preoperative management

At the time of consultation, the patient should be questioned as to the medical history, present medication, the state in everyday life, and of any past complications to have resulted from dental treatment. In particular, any complications arising at the time of anesthetic induction should be questioned thoroughly. With regards to the medical history and of the present medication, a consultation with the medical doctor in change of the patient may be needed.

<Management of the patient who are currently taking bisphosphonates>

The use of bisphosphonates (BP) for the treatment of osteoporosis has attracted a lot of attention in the recent years. A guideline regarding this has been published by the Japan Dental Association and the Japanese Society of Oral and Maxillofacial Surgeons. Here, for those patients that have been administering oral bisphosphonates for a period of less than three months who are also concomitantly taking corticosteroids, or in those patients who have been administering oral BP for a period of more than three years, where it is possible to temporarily stop the administration, from patient observation, the administration of oral BP agents should be avoided for at least three months prior to the invasive dental treatments such as implant surgery, and the administration of BP should not be re-started till some progress of the bone healing has been determined.

In the case of the administration of BP that has been continuously administered for a period less than three months with no associated risk factors, there is no need for any delay or prevention of invasive dental treatment; or stopping the administration of the oral BP.

2. Perioperative management

In addition to a sufficient understanding of patient's internal diseases well before surgery, use of monitoring devices such as pulse oximeter, sphygmomanometer, and electrocardiogram (Fig.2-1-14) may be required.

The full body monitoring is required in the case of using a combination of nitric oxide inhalation sedation and an intravenous sedation as there are risks of respiratory and circulatory depression presenting. The patient should be positioned in such a way that is suitable for the surgeon to conduct the surgical procedures, and in a way that is most comfortable for the patient. During the procedure, the vital signs of the patient should be monitored and recorded where necessary, in accordance with the reactions to vocal checks and any changes in the vital signs.

Fig.2-1-14 Patient physiology monitor (Nihon Kohden, TM-2572®)

3. Postoperative care

After the procedure, the state of the patient should be evaluated with regards to the following: any presence of foreign matter, bleeding, or swelling in the oral cavity; state of consciousness; respiratory state; blood pressure and pulse. Then make the patients rest on a chair or on the bed. Right before the discharge, the vital signs and any lightheadedness and motor functions should be re-evaluated, and upon confirming their steady state, they can be allowed to go home. There are a number of instructions that

should be given before the patients are discharged (Fig. 2-1-15). These should be well explained, to gain patient understanding. Instruct the patient not to eat for a while under anesthetized condition. The patient should be cautioned not to drink alcohol or undergo vigorous exercise, and inform the medical team as soon as the symptoms of nausea, bleeding, or paralysis present after returning home. Prescribe a course of antibiotics and anti-inflammatories as a preventative measure against contracting infection, and for pain control, and instruct their dose regimens. Instruct the patient to avoid chewing in the implanted position, and not to touch the area with the tongue for the month following surgery.

1) Avoid any exercise, bathing , or drinking alcohol and rest your body for the day after the surgical procedure
2) Avoid smoking, as this may affect the healing process
3) Meals:
   For the following week, eat mainly soft food on the side opposite to the implant installed.
   Eat with caution for at least a month after
4) Tooth brush: brush softly, using a soft brush (Fig. 2-1-16).
5) Avoid chewing strongly and touching with the tongue for the month following the procedure. It can lead to aberration or loosening of implants.

[After implant installation]

1) The gingivae structure surrounding the implant body should be rested for at least a month following implant installation
2) The superstructure placement takes a period of one and a half to three months.
3) The lifetime of the implant are highly dependent on the state of oral hygiene, therefore please consider the following points:
   i) Brushing and gargling (time of awakening, after each meal, before sleeping)
   ii) Use of soft brush, and interdental brushes
   iii) Regular follow-up (once a month initially, followed by 3 to 6 months after a year).

Fig. 2-1-15 Instructions

Fig. 2-1-6 Example of toothbrush for implant

III. The course of implant treatment (Fig. 2-1-17) and roles of each staff

A. Treatment planning

The implant treatment should be planned with the considerations to the oral functions, needless to mention the necessity to examine any systemic symptoms before this. The treatment plan should encompass the goal that is expected by the patient, therefore it is vital to determine whether the wish is a one-by-one recovery, or by means of overdenture. In presentation of insufficient alveolar bone for an implant treatment, the treatment options to conduct bone grafting/ maxillary sinus floor elevation to facilitate the implant treatment; or alternatively to repair with the application of bridge of temporary dentures, without the implant installation, should be explained. The plan should be produced comprehensively with concerns as to the possibility of implant installation that is in tune with the physiological and aesthetic outcome with the superstructure that is expected by the patient. A treatment without planning should be avoided that is though up with the treatment progress. The implant treatment should be founded upon the aspects of prosthesis and with regards to the means to recover the occlusion, as much as possible.

B. Preoperative examination

The decision as to the type and size of the implant bodies is the following necessity after the treatment plan has been established. If the one-stage type is chosen, whether to select a one-piece or a two-piece type becomes the subsequent step. In choosing the one-piece type, it is further divided into the straight and T-type therefore the state of treatment area should be considered carefully. There are 5 mm, 4 mm, 3 mm in the diameter of the fixture, with different lengths; therefore a sufficient preparation alongside a substitute is essential.

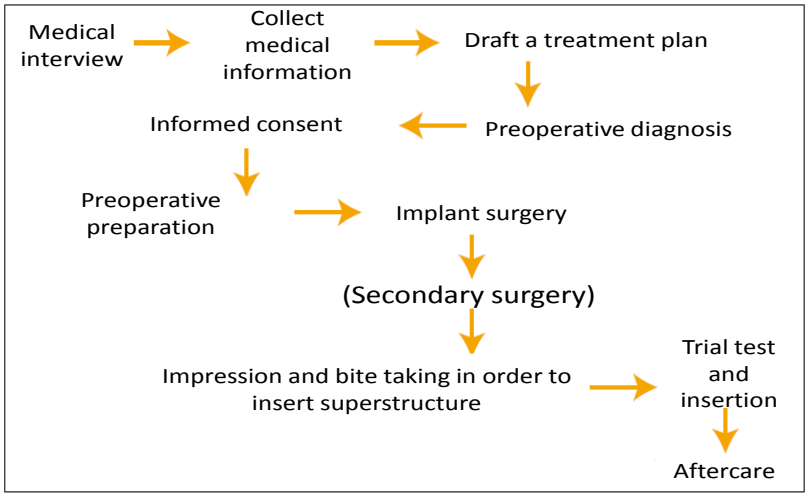


Fig 2-1-17 Implant treatment flow

C. Surgical preparation

The preparation of surgery as well as the sterilization of the surgical area is preferred to be conducted by at least two members of paramedics, with sterilized gloves, who have sufficient knowledge in the field of surgery.

D. Perioperative, postoperative

Surgery is performed by a team consisting of a surgeon, several assistants, a paramedical staff wearing sterilized grooves, and a circulating paramedical staff. It is the staffs who inform the patients directly after the surgery, with the postoperative care, and meal instructions. The used apparatus should be cleaned immediately after use and stored. Once the integration of the implant with the bone has been established, fabricate a temporary structure, and adjust the structure accordingly. The final prosthesis

should be fabricated by the dental technician after the impression and occlusal profile have been taken by the dental practitioner. The final placement of the prosthesis should be done once its suitability, occlusion, aestheticity, and hygiene have been checked.

E. Aftercare

A regular follow-up should be conducted to evaluate the occlusal state, periodontal tissues, and oral hygiene of the patient. In order to determine and manage any modification in the occlusal positions and occlusal relationships, the conditions of the oral cavity with regards to: occlusal relationship, state of hygiene, loosening and any motions of the restorative agents, state of the gingivae surrounding the implant body, pocket, bleeding, and the presence of any alveolar bone resorption surrounding the implant. The regular follow-up can also act as a motivator in the case where the hygiene is below the expected level.

F. Summary

It is vital to acknowledge that the implant treatment that requires a team of a dental practitioner, a dental hygienist, dental assistants, and a dental technician. Another factor that is worth noting is that, even though we have undergone a multiple cases of implant treatment, most of the patients are undergoing the implant treatment for the first time, therefore the treatment plan must be constructed with intimate details, and conduct sufficient communication between the dentist, dental hygienist and the paramedics, in order to share the thoughts of each professional with the aim to consolidate the views with regards to the treatment steps, treatment methods, the explanations given to the patient.

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