

How to use “Frame Cut Back Tray” for new method of preliminary impression

- First step for attaining mandibular complete denture effective with suction

Jiro Abe, representative of Japan Dentuer Association
Chofu-shi, Tokyo e-mail: jiroabe@ra2.so-net.jp

■1. Suction principle of mandibular complete denture

How are the procedures for attaining suction effective complete denture in the mandible?

If any hole is created with a round bur in the palate of maxillary complete denture, the denture will drop very instantly. As long as the denture border is sealed entirely, it never drops. Alternatively, suction phenomenon in maxillary denture cannot be established even one hole of any air leaking is permitted in the denture marginal border.

Same thing is valid in mandibular complete denture. The absolute requirement for attaining suction effective mandibular complete denture is exactly same with that of maxillary denture, and the entire denture border should be closed and this principle is very clear.

■2. Area that is hard to close

Success rate of suction can be especially high by focusing on the area that is hard to seal, namely in the area of retromolar pad and the surrounding tissues.

In order to seal these areas very exactly, it is very important, first of all, to minimize as much shape changes as possible from pressures of an impression tray or alginate impression material during the course of preliminary impression of the retromolar pad areas and the surrounding tissues.

Deformation of oral tissues from impression taking in the course of denture making is one of major contributing factors that damage precision of custom tray that is going to be used in the next step.

Varieties of muscles are attached around the retromolar pad, but no muscles are attached there directly. So, not only deformation caused from the impression pressure but also the posterior end of the pad will be lifted and deformed posteriorly and superiorly by extension of pterygomandibular fold at the mouth opening. In this way, retromolar pad areas are of easy deformable tissues.

Now what shape condition of retromolar pad is required in the impression taking?

For attaining suction effective mandibular complete denture, it starts from taking impression of static state at rest position of mandible in the oral cavity including retromolar pad.

And then after a cast model is made from this impression, a well fit custom tray will be made later, and, at the same time, some technical tips for taking suction effective impression will be employed in this custom tray.

■3. “Frame Cut Back Tray” , so-called a frameless impression tray

Major cause that deforms the retromolar pad area is a frame of impression tray, or in other words, its existence as a deforming frame. So the frame part is removed at any critical area that is vital to border closing. And it is so-called “Frame Cut Back Tray” (hereafter named as FCB Tray) as new method of snap impression.

Its design feature is shown in Fig.1. The author once presented it under the name of

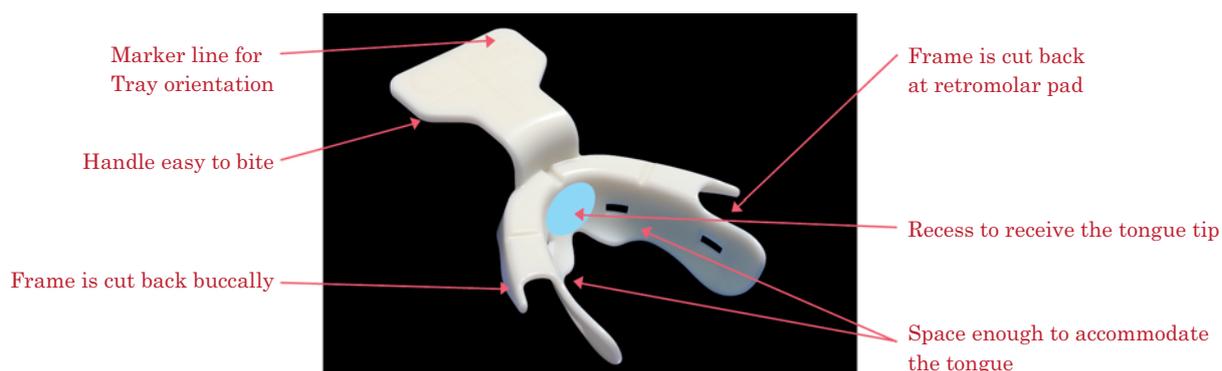


Fig.1 Features of “Frame Cut Back Tray”

“a frameless tray” in many lecture courses before. But it is true of reasoning from some opinions that “frameless” is contradictory because it has some remnant amount of frame design. So a new name is given as “Frame Cut Back Tray” because some amount of frame design remains cut back and reduced.

■4. Material of FCB Tray (disposable type)

FCB Tray is of a plastic made product for disposable use.

A plastic disposable product is appropriate in protection against infection, and reuse of medical devices is not accepted worldwide. Edentulous residual ridges in the mandible differ greatly in anatomy among individuals and so the frame requires necessary cut back adjustment to adapt to their ridge forms.

Also the material is of reinforced plastic that is resistant to breakage.

■5. Impression material used with FCB Tray

Conventional preliminary impression method that has been passed down so far is a method of impression taking with singly independent alginate material. But facts are involved with never ending technical errors of air entrapment and insufficient flow of material all the way into critical areas. Especially in the mandible, the presence of tongue inhibits precise impression only with single round of taking material. So it has been generally thought it extremely difficult to take an impression of retromolar pad without deforming.

“FCB Tray” impression method, on the contrary, is developed in an object to obtain almost similar quality of impressions by any clinicians even with less experienced skills.

The impression method using FCB Tray this time is based on a double impression technique: first, alginate material as usual (Alflex Dust Free, manufactured by Nissin Dental Products Inc., distributed by J.Morita Corp.) is mixed with 50% higher water ratio than specified and injected with a syringe into the oral cavity: second, an impression material with higher consistency than that alginate (Alflex Denture, manufactured by Nissin Dental Products Inc., distributed by J.Morita Corp.) is mounted on the Tray.

By using these two kinds of impression materials, incomparably better quality of impression becomes available in beauty and precision.

■6. Concept based on this impression taking (Closed mouth preliminary impression at rest position in the mandible)

A preliminary impression taking in general, recommended in dental school education, is a method of taking impressions of anatomical landmarks, or bony attachments of muscles as much clearly as possible.

Based on this concept, as long as an impression is not taken beyond these muscle attachments, no pain is developed, and an impression body with larger load bearing surface is gained so that masticatory efficiency can be better enhanced. A denture made from this concept is likely to extend oral mucosa larger than necessary, and a patient will often feel it too much in size.

On the other hand, in case of trying to attain suction effect with mandibular complete denture, muscle attachment regions are not concerned. Greatest majority of concern with this impression taking is how the entire marginal sealing is accomplished by containing a denture with oral mucosa like sublingual mucosa or buccal mucosa joined together with best appropriate surface adhesion of denture inner surface.

What really makes up of oral cavity is connective tissues folded in layers above muscles, fat tissues, blood vessels and nerve tissues as well as most superficial epithelium. Depending on their thickness, shapes of oral cavity vary individually.

In other words, the preliminary impression used with FCB Tray is based on emphasis of impressions of shapes in the mouth being molded from oral mucosa rather than muscle attachments. This is the first important step crucial to attaining suction effect with mandibular complete denture.

■7. Closed mouth impression taking at rest position in the mandible

In order to take a preliminary impression of shapes of retromolar pad area close to mandibular rest position, impressions should be taken under static condition with mouth closure in the mandible (Closed mouth impression taking at rest position in the mandible).

As a goal, this impression taking is set up to reproduce a neutral denture space by expanding it with the help of consistent nature of alginate impression material. The greatest benefit of this impression method is to make a start of producing custom tray made from a preliminary impression body within reasonable size and to create a precise and functional impression for attaining the denture marginal border seal entirely.

■ 8. Impression taking method with “Frame Cut Back Tray”

A preliminary impression with FCB Tray is a double impression taking using an alginate impression material with good flow joined together with basis of another alginate impression material with higher consistency. This impression method will help minimizing air entrapment and providing fine quality of impression. Procedures of this impression method with “FCB Tray” will be illustrated as in the followings.

1. Selection of Tray

The lingual wing of Tray is good to be extended around the posterior end of retromolar pad. Select FCB Tray in size M or L depending on the size of residual alveolar ridge. Tray can be modified in shape as needed for adapting to each patient’s reasonable size (Fig.2,3).

2. Trial insertion of Tray

Seat the Tray in the mouth. Advise a patient to rest the tongue on the Tray and close the mouth slowly to bite the Tray handle and stay still there free from any tension (Fig.4,5).

3. Marking of Tray position

Mark the position on the handle. Advise a patient here to repeat same motion even after Tray is mounted with an impression material (Fig.6).

4. Mixing of impression material

Mix one measuring spoon of Alflex Dust Free Regular type with water ratio of increase by 50%, and, at the same time, mix two spoons of Alflex Denture with normally specified water ratio (Fig.7).

5. Injection of impression material with a syringe

Alflex Dust Free is loaded in Terumo syringes 50ml:ss50cz or alternatively 30ml:ss30cz 2ok and injected in sequence into the lingual side of retromolar pad→sublingual fold→the lingual side of opposite retromolar pad →the buccal side of retromolar pad→molar teeth→anterior teeth→molar teeth (Fig.8).

6. Mounting the impression material on the Tray

Alflex Denture is loaded on FCB Tray. Some amount is also loaded on the frameless part of Tray at retromolar pad (Fig.9)

7. Impression taking

Likewise as the trial insertion, match the anterior part of Tray with the ridge part, and next, insert the Tray wing into retromylohyoid fossa and advise to rest the tongue on above lightly pressing the mandible. Contrary to conventional impression taking, no strong pressure is needed (Fig.10~12).

8. Confirmation of Tray position

Advise to bite the handle and check the Tray position as marked (Fig.13).

9. Pressure loading from an operator

Stand behind the patient and press the buccal shelf toward the superior direction with the hands palm. This action will help preventing accumulation of excessive amount of material around the buccal shelf (Fig.14).



Fig.2



Fig.3



Fig.4



Fig.5



Fig.6

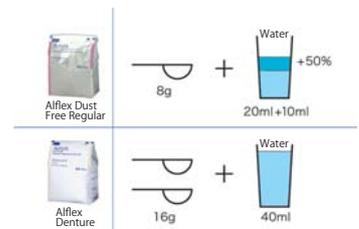


Fig.7



Fig.8



Fig.9



Fig.10



Fig.11



Fig.12



Fig.13



Fig.14



Fig.15

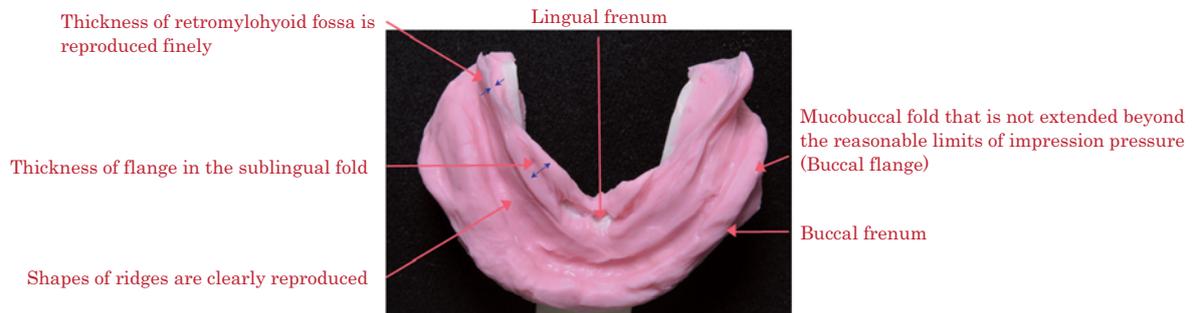


Fig.16 Check of Impression body

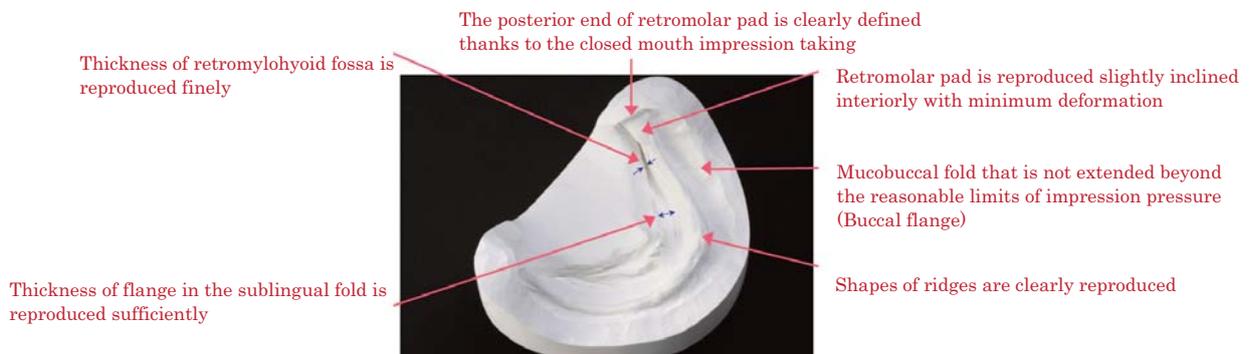


Fig.17 Check of cast model

An impression with FCB Tray reproduces a denture space that is within reasonable limits by cutting back the tray frame.

10. Removal of impression

After hardened, remove an impression from the mouth. Thanks to the closed mouth static impression taking, the posterior marginal end of retromolar pad is clearly defined. And the impression body shows the retromolar pad in approximately similar shapes to the mandibular rest position (Fig.15).

11. Check of impression body (Fig.16).

12. Check of cast model (Fig.17).

9. Conclusion

Engineering developments of attaining suction effect of mandibular complete denture that no one had ever thought possible before were started from understanding of its mechanism.

Technology of suction effect from mandibular complete denture could be flourishing only after its mechanism clarification, development of clinical technique that everyone can do, and manufacturing and distribution of necessary products and materials. FCB Tray is developed through the course of these processes. Just try it in your practice.