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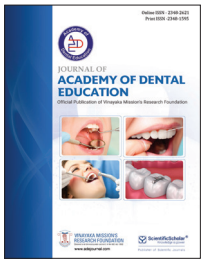

Review Article

Pre-extraction records in edentulous patients: A literature review

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ABSTRACT

Success of a treatment lies in proper examination and treatment planning. Pre-extraction records have significant part in deciding the treatment plan. They help us determining progressive changes that would have taken place after exfoliation of natural tooth, guide us in determining the vertical dimension, teeth positioning, and also establish a harmonious relationship between teeth and lips. This review article enhances the importance of pre-extraction records and various methods that can be used in treatment planning for edentulous patient.

Keywords: Pre-extraction record vertical dimension, Complete denture, Profile photograph, Speaking space

INTRODUCTION

Complete denture service restores the stomatognathic system, thereby improves the general health of the patient. The face expresses the fullness of life and soul. The effect on facial appearance due to loss of teeth often causes psychological trauma. Vital areas of expression are located in the region of the mouth and it is the teeth which impact character to impression. Pre-extraction records are required for all the patients. These records will serve as a template in the construction of dentures and will also be of importance for any subsequent denture. Pre-operative records can provide information about the shape, form, color, placement of the natural teeth, the support the lips, and the relationship of the teeth to the lips for the design of the complete denture. Pre-extraction records act as a base for construction of complete denture. Pre-extraction records have been most abandoned topic but it plays a meaningful role in treatment planning. This literature review focuses on the significance of pre-extraction records in edentulous patients.

CLASSIFICATION

I GENERAL CLASSIFICATION[1]	
1. Pre-extraction diagnostic casts[2-6]	
2. Instruments	The Dakometer[1] Profile template[3,7] Willis's gauge[1] Sorenson profile scale[6] Orofacial device[8]
3. Measurements	Tattoo points[6] Interfrenal distance[6] The closest speaking space[9]
4. Photographs[4,10]	
5. Radiographs[2,4]	Roentgenograms
6. Others	Old denture[11]
II BASED ON METHODS	
1. Extraoral methods	The Dakometer[6,12] Sorenson profile scale[6] Cardboard profile[6] Orofacial device[8] The profile tracer[7] Facial template[13] The closest speaking space[9]
2. Intraoral methods	The interfrenal distance[6] Measurement between tattoo dots on gingival[6] Measurement of nose-chin distance[6]
III BASED ON USES[1]	
1. Recording vertical dimension of occlusion	Pre-extraction diagnostic cast[2-6] The Dakometer[6,12] Profile template[7] Facial template[13] Willis guide[1] Sorenson profile scale[1] Orofacial device[8] Photographs[4,10] Radiographs[2,4] Old dentures[11]
2. Recording centric relation	Pre-extraction diagnostic casts[2-6]
3. Arranging upper anterior teeth for a completely edentulous patient	Pre-extraction diagnostic cast[2-6] The Dakometer[6,12] Profile template[7] Wills guide[1] Incisor point locator[6] 3-dimensional photography[4] Photographs[4,10] Old dentures[11]
IV BASED ON MEASURING METHODS	
1, Special gauge	Wills guide[6] Sorensen profile scale[1] The Dakometer[6,12]
2. Profile method	Profile template[1] Cardboard profile[1] Wire profile[3]
3. Measurements	From photographs[4,10] Interfrenal distance[6] Closest speaking space[9] Tattoo dots on gingival[6]
4. Gauge oriented on palate[3]	
5. Facial template[13]	
6. Old dentures[11]	

PRE-EXTRACTION DIAGNOSTIC CASTS[2-6,14,15]

Pre-extraction casts are a life size reproduction of the part of the oral cavity and facial structure for the purpose of study and treatment planning (Glossary of Prosthodontic Term - 9). Mounting the upper and lower cast acts as an important source of information for the study. They provide information about the teeth and inter-ridge distances in case of opposing edentulous spaces. Pre-extractions diagnostic cast acts as important pre-extraction records and is used in selection of the anterior teeth and measuring the arch width. They are also used in measuring the overjet and overbite [Figure 1].[6]

THE DAKOMETER[1,6,12]

Dakometer is an instrument that records the vertical dimension and position of the upper central incisors. Recordings can be obtained with an error of ±1 mm.

THE WILLIS GAUGE[6,12]

It is used for recording vertical dimension before extraction. The arm (A) contacts the base of the nose, the arm (B) moves along the slide (D) touching the lower border of the chin. It is locked by the screw (C). The distance on the scale (D) gives the vertical height.

Disadvantages

This is not a very accurate measurement. The same degree of pressure is applied when the instrument contacts with the base of the nose and under surface of the chin.

THE SORENSON PROFILE SCALE[6,14]

The Sorenson Profile Scale is used to obtain a pre-extraction occlusal vertical dimension. This is done by placing the nasion locator at the bridge of the nose and the chin seat is raised slightly as it touches the most inferior and anterior border of the chin. The patient is asked to bring posterior teeth in centric.

CARDBOARD PROFILE RECORD[6]

This method was given by Ballard. This record gives the occlusal vertical dimension and the facial contour (median plane). This is the record of the patient with natural profile. This could be taken by the dentist once in 4 years and adjust the dentures to restore the normal profile. The cardboard profile is used similar to the Sorenson Profile Scale.

INTERFRENAL DISTANCE[6]

Interfrenal distance is the distance between the maxillary labial frenum and mandibular labial frenum, from which it is measured when the teeth are in occlusion before extraction. This is used for the determination of occlusal vertical dimension during complete denture fabrication. Pair of dividers is used to measure the interfrenal distance. This measurement could not be used if surgery was done on any of the labial frenum and the highly resorbed maxillary and mandibular ridge leads to the displacement of a frenum [Figure 2].

Figure 1: Pre-extraction record.

Figure 2: Interfrenal distance.

TATTOO DOTS

This was given by Silverman where tattoos (India ink) are placed in the upper and lower gingiva. They are placed between attached gingiva and depth of vestibule. Dividers are used to make three measurements while the patient is speaking, and mean of those measurements is used.

Limitations

1. Tattoo points are not a permanent point because sometimes it may disappear.
2. As it is a soft-tissue measurement, changes in soft tissues would occur after tooth extraction. This could lead to errors during complete denture fabrication.

NOSE-CHIN DISTANCE[4,6]

The nose-chin distance is given by Smith. This is used to determine which acts as a pre-extraction record. The distance between the base of the nasal septum and the inferior contour of the chin is measured. This is done with a plastic ruler. Since chin is a soft-tissue area, the pressure applied to this area is not same all the time.

Advantage

This is a simple, convenient, inexpensive, and accurate method which does not require sophisticated instruments.

INCISOR POINT LOCATOR[6]

This method was introduced by Smith in 1971 which records the incisor point. An instrument is used to transfer the incisor point location from a pre-extraction diagnostic cast to the edentulous occlusal rim.

FACIAL TEMPLATE[4,7,13]

Facial template is the outline form, pattern, or mold of the face used for the construction of complete denture; this acts as a permanent record. It is easy to fabricate a denture with previously recorded intermaxillary space, predetermined jaw relationship, size, and shape of teeth.

PROFILE RECORD[3]

By adapting wire to the facial contour and using radiographic techniques or using photographs, profile records can be obtained. Profile records obtained before surgery help us in determining the exact position of anterior teeth and lip support to be provided by the dentures to obtain a desired esthetic result.

DETAILS FROM PREVIOUS/OLD DENTURES[11]

This method is only applicable if existing denture is present and they are within a normal limit. The old denture can be inserted, thereby horizontal and vertical relationship can be examined. Since we have the measurements of previous denture, occlusal rims can be constructed with same dimension thereby saving time [Figures 3 and 4].

THE PROFILE TRACER[6,7]

The device has been made to allow the dentist to trace rapidly and accurately, a profile record for a patient with minimal difficulty. The initial device, developed in 1931, has been used to record the profile of patients who are to have all remaining teeth removed and dentures constructed.

PHOTOGRAPH[4,12,14-17]

Photograph of the patient can be used in selecting size, form close to that of natural teeth and necessary modifications can be done.

Figure 3: Measurement of vertical height on old denture.

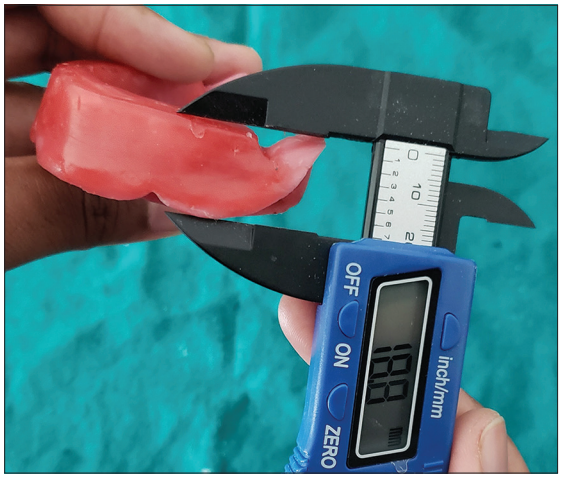

Figure 4: Adjusted vertical height on occlusal rim.

The proportion is arranged as:

$$\frac{\text{Interpupillary distance of patient}}{\text{Interpupillary distance on photograph}} = \frac{x}{\text{Width or length of central incisor on photograph}}$$

ROENTGENOGRAMS[18-21]

They are used for selecting anterior teeth. They help in selecting crown form, width, and length. It shows impacted or impacted teeth, residual roots, and quality of alveolar bone.

ANTHROPOMETRIC MEASUREMENTS[17]

Width of the upper central incisors can be obtained by dividing the bizygomatic width by 16. The width of the upper six anterior can be obtained by dividing the bizygomatic width by 3.3. They help in selection of artificial teeth.

PRE-EXTRACTION PROFILE RECORDS[22]

Profile record is a registration or record of the facial profile of the patient. These records contain valid pre-extraction information. They can be stored in patient's chart [Figure 5].

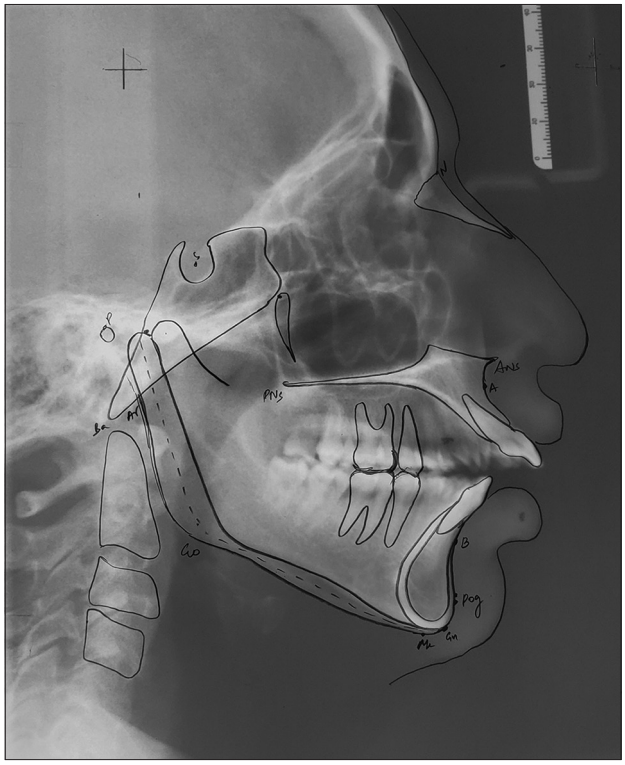

Figure 5: Traced soft-tissue profile.

Advantages

1. Recording of clinical data is done before extraction of the natural teeth; hence, it is easy, quick, and inexpensive.
2. Pre-extraction record can be stored in patients chart.
3. Once natural teeth are extracted, these records can be used to compensate for changes that occur.

THE SPEAKING METHOD[23,24]

Before the loss of natural teeth, this method can be used to measure the vertical dimension and can be reproduced in complete denture.

Advantage

1. Measurement of vertical dimension using this method is simple and requires less time.
2. Measurement can be made in <1 min and hence it is very practical.
3. This method is accurate.

THREE-DIMENSIONAL PHOTOGRAPHY[4]

Pre-extraction records are a necessity for the discriminating dentist. Specifically, designed equipment and different cameras are used for this purpose. They contain series visual images of the patient and hence they help in tooth arrangement. This helps in exact reproduction of the natural appearance.

NATURAL TEETH[19]

The natural teeth are collected after the teeth have been extracted and preserve it or before extraction by taking hydrocolloid impression, extracted teeth were positioned in the impression and pour a cast. This gives the arch size, shape, and form of natural teeth, but is not used to identify tooth color because extracted teeth are unreliable as they dehydrate and become lighter.

ESTHETIC OCCLUSAL RIMS[2,5]

They help in reproduction of natural teeth in the occlusal rims. It uses various pre-extraction records and study casts.

OROFACIAL DEVICE[8]

This is used for determining and establishing the occlusal vertical dimension and occlusal plane.

USES OF PRE-EXTRACTION RECORDS

1. For diagnosis and treatment planning.
2. Pre-treatment and post-treatment evaluation.
3. For the study and research purposes.
4. Establishing vertical dimension of occlusion and to maintain the jaw relationship that existed in natural tooth.
5. To determine the correct profile of the upper and lower lips, placement of upper central incisor with proper inclination, and occlusal plane angle.
6. Used for incisal placement of the upper and lower anterior teeth with horizontal and vertical overlap and appropriate positioning of maxillary and mandibular central incisors labiolingually.
7. For the selection of anterior teeth using photographs and shades of the extracted natural tooth during complete denture fabrication.
8. Date of fabrication of the pre-extraction record is noted for the future reference.
9. Articulator guidance can be adjusted using occlusal facets present in natural teeth.

Limitations

1. Error of ±1 mm is obtained during recording of vertical dimension of occlusion using Dakometer and Wills gauge. In severely resorbed ridges, the pre-extraction records are less valuable for the construction of dentures.
2. In any facial fractures, trauma, or maxillofacial cases, the pre-extraction records are less important because of the loss of facial structures.
3. Very difficult to maintain these records for a long time as the diagnostic cast and materials get abraded or accidental fall fracture may occur. Photograph gets faded if kept for a long time.
4. The tattoo dots, interfrenal, or soft-tissue measurements are more prone to change their position after extraction and can cause error in fabrication.

CONCLUSION

The pre-extraction records are simple, effective, practical, and time saving during complete denture fabrication. The pre-extraction record is used for teeth arrangement similar to natural teeth, thereby achieving excellent patient confidence. Casts of the upper and lower teeth can be mounted and used for the study. Anatomic characteristics can be preserved and used for the study by making pre-extraction records.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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