Diagnostic Aids-Case History and Clinical Examination

INTRODUCTION

Treatment is secondary, the primary task for the clinician is to identify the problem and find its etiology. Once this is done, and only then can a treatment plan be formulated. Diagnosis involves the development of a comprehensive and concise database of pertinent information, sufficient to understand the patient's problem as well as answer questions arising in the treating clinicians mind. The data is derived from essential and nonessential diagnostic aids or supplemental diagnostic aids.

ESSENTIAL DIAGNOSTIC AIDS

Essential diagnostic aids, as the name suggests are considered essential for the diagnosis of an orthodontic case. Ideally before starting a case, a treating clinician must possess these aids. These include the following.

1. Case history
2. Clinical examination
3. Study models
4. Certain radiographs
   a. Periapical radiographs
   b. Lateral radiographs
   c. Orthopantomograms
   d. Bite wing radiographs
5. Facial photographs

These diagnostic aids are simple and easy to obtain except for specialized radiographs like orthopantomograms and lateral cephalograms where a specialized radiographic setup might be required.
NONESSENTIAL OR SUPPLEMENTAL DIAGNOSTIC AIDS

These diagnostic aids may be required only in certain cases and may require specialized equipment, which might not be available in every dental clinic. The supplemental diagnostic aids include

1. Specialized radiographs; like
   a. Occlusal views of maxilla and/or mandible
   b. Selected lateral jaw views, etc.
2. Electromyographic examination of muscle activity
3. Hand-wrist radiographs
4. Computed axial tomography (CT scan)
5. Magnetic Resonance Imaging (MRI)
6. Endocrine tests and/or other blood tests
7. Estimation of the basal metabolic rate
8. Sensitivity (vitality) tests
9. Biopsy

CASE HISTORY

Case history is the information gathered from the patient and/or parent and/or guardian to aid in the overall diagnosis of the case. It includes certain personal details, the chief complaint, past and present history. The aim is to establish a rapport with the patient and to obtain an accurate account of the individual's complaints, which, following examination will enable, a diagnosis to be made.

PERSONAL DETAILS

These include very basic data, for communication and access. It includes:
**Name**

The patients name should be recorded not only for the purpose of communication and identification but because it gives a personal touch to the following conversation. It makes the patients more comfortable when he is addressed by his first name and arouses a feeling of familiarity, which has a positive psychological effect on the patient.

**Age and Date of Birth**

The chronologic age of the patient helps in diagnosis treatment planning and growth prediction. Certain transient conditions, which might be perceived as malocclusion by the patient and parents, can be identified and the concerned are counseled accordingly. The age of the patient also dictates the use of certain treatment protocols-for example, surgical correction might be advocated following cessation of growth whereas the same malocclusion might be treated using functional appliances if the patient has a potential to grow.

**Sex (gender)**

Sex of the patient also helps in treatment planning. Girls mature earlier than boys, i.e. the timing of growth related events including growth spurts, eruption of teeth and onset of puberty are different in males and females. Psychologically also the reaction of males and females may be different to similar malocclusion. Females are generally more concerned about facial aesthetics.

**Address and Occupation**

These are important for communication, assessing the socioeconomic status as well as for records. The socioeconomic status might dictate the kind of appliance required. Also, patients coming from far may require a different appliance therapy as they might not be able to visit the clinician more frequently.
CHIEF COMPLAINT

The patient's chief complaint should be recorded in his or her own words. It should mention the conditions the patient feels he/she is suffering from. This helps in identifying the priorities and desires of the patients. The parents' perception of the malocclusion should also be noted. This will help in setting the treatment objectives and satisfying the family in general.

MEDICAL HISTORY

Knowledge of a patient's general health is essential and should be obtained prior to examination. It is best obtained by a questionnaire. In most cases orthodontic treatment can be undertaken but precautions may be required prior to extractions. Antibiotic coverage may be required in patients with rheumatic fever or cardiac anomalies even for molar band placement/removal, if the adjacent gums are inflamed or bleeding is anticipated. Mentally or physically challenged patients may require special management.

DENTAL HISTORY

The patient's dental history should include information on the age of eruption and exfoliation of deciduous and permanent teeth. Reason for exfoliation will also hint at the oral hygiene maintenance capabilities of the patient. The past dental history will also help in assessing the patients and parents attitude towards dental health.

PRENATAL HISTORY

Prenatal history should concentrate on the condition of the mother during pregnancy and the type of delivery. Her nutritional state and any infections that she might have will affect the developing teeth of the child. The use of certain drugs or even excess use of certain vitamins can result in congenital deformities of the child. Forcep deliveries have been associated with injuries to the temporomandibular joint (TMJ). Excess forcep pressure in the TMJ region can cause ankylosis of the joint and associated mandibular growth retardation.
POSTNATAL HISTORY

The postnatal history should concentrate on the type of feeding, presence of habits especially digit/thumb sucking and the milestones of normal development. Tongue thrust and digit sucking habits are associated with mal occlusions. These will be discussed later in detail.

FAMILY HISTORY

Skeletal malocclusions especially skeletal Class III malocclusions and congenital conditions such as cleft lip and palate are inherited. Detailed records of such malocclusions might aid in any future studies on the subject.

CLINICAL EXAMINATION

GENERAL EXAMINATION

General examination should begin as soon as the patient first comes to the clinic. A general appraisal of the patient is done. The clinician should observe the gait, posture and physique of the patient. Height and weight are recorded to assess for the physical growth and development of the patient. Abnormal gait may be present due to an underlying neuromuscular disorder. Abnormal posture also may lead to malocclusions.

Body Build

Sheldon classified body build into:

a. Ectomorphic: Tall and thin physique
b. Mesomorphic: Average physique
c. Endomorphic: Short and obese physique

Cephalic and Facial Examination

The shape of the head can be evaluated based on the cephalic index of the head which was formulated by Martin and Saller (1957) as:
**maximum skul width**

\[ I = \frac{\text{maximum skull width}}{\text{Maximum skull length}} \]

**Index values**

- Mesocephalic (average) 76.0 - 80.9
- Brachycephalic (short, broad skull) 81.0 - 85.4
- Dolicocephalic (long face, narrow skull) < 75.9
- Hyperbrachycephalic > 85.5

![Diagram of head types A, B, C](image)

**Fig 1: Classification of head types: (A) Mesocephalic head, (B) Brachycephalic head, and (C) Dolicocephalic head**

The index is based on the anthropometries determination of the maximum width of the head and the maximum length. The shape of the face is assessed by the morphologic facial index which was given by Martin and Saller (1957) as:

\[ I = \frac{\text{Morphologic facial height (distance between nasion and gnathion)}}{\text{Bizzygomatic width (distance between the zygoma points)}} \]
Index values

- Hypereuryprosopic: low facial x – 78.9
- Euryprosopic: skeleton 79.0 – 83
- Mesoprosopic: average facial skeleton 84.0 – 87.9
- Leptoprosopic: high facial 88.0 – 92.9
- Hyperleptoprosopic: skeleton 93.0–x

The type of facial morphology has a certain relationship to the shape of the dental arch, e.g., euryprosopic face types have broad, square arches; border line crowding in such cases should be treated by expansion. On the other hand, leptoprosopic face types often have narrow apical base/arches. Therefore, extraction is preferred over expansion.

Assessment of Facial Symmetry

A certain degree of asymmetry between the right and left sides of the face is seen in most individuals. The face should be examined in the transverse and vertical planes to determine a greater degree of asymmetry than is considered normal. Gross facial asymmetries may be seen in patients with:

i. Hemifacial hypertrophy / atrophy
ii. Congenital defects
iii. Unilateral condylar hyperplasia
iv. Unilateral Ankylosis, etc.

Fig. 3: Facial asymmetry
Facial Profile

The profile is examined from the side by making the patient view at a distant object, with the FH plane parallel to the floor. Clinically or in extraoral photographs the profile can be obtained by joining two reference lines:

a. Line joining forehead and soft tissue point A
b. Line joining point A and soft tissue pogonion:

Three types of profiles are seen:

a. Straight/orthognathic profile: The two lines form an almost straight line.

b. Convex profile: The two lines form an acute angle with the concavity facing the tissues. This type of profile is seen in Class IIT div 1 patients due to either a protruded maxilla or a retruded mandible.

c. Concave profile: The two lines form an obtuse angle with the convexity facing the tissues. This type of profile is seen in Class III patients due to either a protruded mandible or a retruded maxilla.

![Facial Profile Assessment](image)

Fig. 4: facial profile assessment
A: Straight/orthognathic profile. B: Convex profile. C: Concave profile

Facial Divergence

The lower face may be straight or inclined anteriorly posteriorly relative to the forehead. This inclination is also termed as the facial divergence, which may be influenced by the patient's ethnic or racial background.
A line is drawn from the forehead to the chin to determine whether the face is:

a. Anterior divergent, line inclined anteriorly
b. Posterior divergent, line inclined posteriorly
c. Straight/orthognathic, straight line, no slant seen.

Fig. 5: Facial divergent classification A: Anterior divergent profile. B: Posteriorly divergent profile. C: Straight/orthognathic profile