MOUTH BREATHING

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DEFINITION

- **Chacker (1961)**: Prolonged or continued exposure of the tissues of anterior areas of mouth to the drying effects of inspired air.

- **Sassouni (1971)**: Habitual respiration through the mouth instead of the nose.

- **Merle (1980)**: Used the term oro-nasal breathing instead of mouth breathing.

- Compensatory respiration through the oral cavity due to obstruction in the normal passage of respiration leading to disturbances of the orofacial structures when not intervened.
Advantages of nasal breathing:

• The nose acts as a filter and retains small particles in the air, including pollen.
• The nose adds moisture to the air to prevent dryness in the lungs and bronchial tubes.
• The nose warms up cold air to body temperature before it gets to your lung.
• Nose breathing adds resistance to the air stream. This increases oxygen uptake by maintaining elasticity of the lungs.
• Promotes correct positioning of the phono-articulatory organs, and is essential for normal stomatognathic functions
• Oral breathing is a **parafunctional habit** whereby air passes exclusively or partially through the mouth instead of the nose, and it is accompanied by **skeletal and functional alterations** in the orofacial district.

• Most normal people indulge mouth breathing – exercise or sports activity.

• The mode of respiration indulge the **posture of the jaw, the tongue and to the lesser extent the head** which could alter the oro-facial equilibrium leading to **malocclusion**.

• According to **Paul and Nanda**, there is much evidence that mouth breathing produces **deformities of jaw, inadequate position or shape of the alveolar process and malocclusion** that result in the development of **adenoid facies** or long face syndrome.
CLASSIFICATION

• Finn (1987): 3 categories

OBSTRUCTIVE
- Increased resistance
- Partial or complete obstruction

HABITUAL
Out of habit

ANATOMICAL
Short upper lip
Class A: mouth-breathing children with critical postural problems needing spinal rehabilitation care

Class B: mouth-breathing children with moderate changes to normal posture

Class C: mouth-breathing children with posture slightly affected

Two other classes were also proposed:

Class D and E: nose breathers with slightly altered posture
ETIOLOGY

- Emslie, Massler and Zwemer, 1952

**PREDISPOSING FACTOR**
Narrow airway dolicofacials

**EXCITING FACTOR**
Nasal or pharyngeal obstruction

**PERPETUATING FACTOR**
Residual habit
Imitation (James and Hastings, 1932)
Open-mouth habit
Dorsal head sleeping position (Schwarz, 1931)
NASAL OBSTRUCTION

- Pharyngeal lymphoid tissue hypertrophy;
- Intranasal deformities – nasal septum deviation, polypus, postoperative cicatrix;
- Allergic rhinitis; rhino pharyngitis
- Enlarged conchae – due to allergies, chronic infections of the mucous membrane.
- Choanal atresia, nostril atresia
- Chronic sinusitis
- Chronic adenotondillitis
- Chronic hypertrophic rhinitis
NASAL OBSTRUCTION

• Adenotonsillar hypertrophy

• Benign and malignant tumours

• Genetic patterns- ectomorphic children having a genetic type of tapering face and nasopharynx are prone to nasal obstruction

• Cranio maxillofacial alterations, mainly caused by abnormal mandible displacement and subsequent dysmorphism of the oral structures and modified posture

• Obstructive sleep apnea syndrome
PATHOGENESIS

- Pathogenesis of mouth breathing
  
  - Changed position of tongue, jaws and head
  
  - Tongue occupying a back and lower position
  
  - Mandible dropped down,
  
  - Disproportion between jaws and teeth and
  
  - Imbalance between masticatory, mimic and tongue muscles
  
  - Adenoid facies or long face syndrome

CLINICAL FEATURES

1. GENERAL EFFECTS

- In order to breathe, the child bends the neck forward straightening the oro-nasal-pharyngeal path - gives appearance of pigeon chest.
- The oro-pharynx is dry and can produce a low-grade esophagitis.
- Turbinates become swollen and engorged
- Blood gas constituents: blood gas studies reveal that mouth breathers have 20% more carbon dioxide and 20% less oxygen in the blood.
- Forward head posture is seen
- Sleep apnea syndrome
DENTOFACIAL STRUCTURES

• Facial form:

  • More vertical growth pattern
  • Increased facial height and mandibular plane angle
  • Retrognathic maxilla and mandible
ADENOID FACIES

C.V Tomes in 1872.

Characteristic feature of mouth breathers

• Lips are held wide apart
• Lack of tone of oral musculature
• Upper lip is short
• The chin is receded the face has typical pigeon face appearance
• The nose is tipped superiorly
• Long narrow face
• Expressionless face
• The bridge of nose is flat

• Lip
• Lip incompetence
• Short upper lip
• Chapped lips, bulky or flabby
• Gummy smile
▪ Oral-facial muscles
  ▪ Facial muscles hypotonia;
  ▪ Lingual posture low;
  ▪ A-typical swallowing.

▪ Tongue
  ▪ Low lingual posture;
  ▪ Possible short lingual frenulum.
- Maxilla
  - High arch palate
  - Vertical soft palate;
  - Flattened and/or absent cheekbones.

- Mandible
  - Increase in lower facial height;
  - Growth in posterolateral rotation;
  - Distal position or antero position (skeletal Class II or III)
• **Dentition**
  • Buccal version of maxillary incisors;
  • Back inclination of the mandibular incisors;
  • Dento-alveolar crowding;
  • Unilateral or bilateral crossbite;
  • Anterior open bite;
  • Modification of the bacterial flora and increased susceptibility to caries.
• **Speech:**

  Fonesi and timbre of the voice are altered (especially the issuance of certain phonemes such as M, N, NG), nasal tone of voice is seen(75)

• **Halitosis:**

  Oral secondary halitosis is seen in mouth breathing patients, due to decreased salivary flow, decomposition of organic matter is seen in the posterior portion of dorsum of tongue. Leads to release of sulphur compounds
GINGIVA

• “Mouth breathing gingivitis” - chronic marginal gingivitis with pronounced tendency to hypertrophy or hyperplasia
• Decreased salivary flow — Gingiva inflamed and irritated
• Continuous exposure to air — Hyperplastic gingiva
• Classic rolled margins and enlarged interdental papilla
• “Gum ridge” or “Tension ridge” [James and Hastings, 1932] is present on the junction of edematous and normal tissue
OVERALL HEALTH

• Poorer academic achievement and cognitive skills.

• Obligatory mouth breathers - that during loud reading and exercise had negatively impacted phonation threshold pressure under controlled humidity conditions.

• Syntactical complexity and difficulty in understanding written language with lower scores than the control group in the arithmetic test, indicating difficulties with numerical operations.

• Symptoms similar to those of Attention Deficit Hyperactivity disorder (ADHD)

• Associated with asthma and otitis, Atopic Dermatitis in pre-school children of more than 2 years.

• Increase oxygen load in prefrontal cortex.
Clinical and functional tests are made to diagnose the breathing pattern and to differentiate nasal breathing difficulties from the bad habit to stay and sleep with mouth open.
• Parents can be questioned whether the child frequently adopts a lip apart posture.

• Frequent occurrence of tonsillitis, allergic rhinitis, otitis media should be questioned.

• Also whether the patient has restless sleep, snores, wakes up feeling thirsty
• Observe the patient
  Lips
• Ask the patient to take deep breath through nose
  Shape/size: external nares
  good control of alar muscles
• Mirror test: Fog test
• Tissue paper test
• Massler’s water holding test
• Zwemmer butterfly test

• Rhinomanometry (inductive plethysmography): the total airflow through nose and mouth can be quantified using inductive plethysmography

• Cephalometrics: to calculate amount of naso pharyngeal space, size of adenoids, skeletal patterns

• Cephalometric analyses of such patients reveal:
  • Large facial height,
  • Increased mandibular plane angle,
  • Retrognathic mandible and maxilla
ANTHROPOMETRY

- Anthropometric orofacial measurements revealed that there were statistically significant difference between the majority of the orofacial measurements of mouth-breathing children and the measurements of children with no history.
- Noninvasive,
- Simple and economical
Table 1: Proposed guidelines for clinical recognition of mouth breathing.

**CLINICAL RECOGNITION OF MOUTH BREATHING**

These guidelines can be used to examine children and aid recognition of mouth breathing

1. Visual assessment

   The dentist should assess at least the presence of the following characteristics:

   **With the patient standing:**
   - Lack of lip seal
   - Posture changes
   - Dark eye circles
   - Long face

   **With the patient sitting:**
   - Anterior open bite
   - High narrow palate
   - Gingivitis in maxillary incisors

2. Questions

   Questions should be directed to the child or parents

   **Do you:**
   - Sleep with your mouth open?
   - Keep your mouth open when you are distracted?
   - Snore?
   - Drool on your pillow?
   - Experience excessive daytime sleepiness?
   - Wake up with a headache?
   - Get tired easily?
   - Often have allergies?
   - Often have a stuffy nose and/or runny nose?
   - Have difficulty in school?
3. Breathing tests

The child must be sitting. At least two tests should be performed.

a. Graded mirror test

After the second output of air on the mirror, mark the halo area with a marker (Fig 1).

(Low nasal flow: up to 30 mm; Average nasal flow: 30-60 mm; High nasal flow: above 60 mm)

b. Water retention test

Place water in the patient’s mouth (approximately 15 ml) and ask him/her to hold it for 3 minutes.

c. Lip seal test

Seal the patient’s mouth completely with a tape for 3 minutes.

4. Training to eliminate the habit of mouth breathing

Training should be performed at home on a daily basis until the child is able to return to nasal breathing.

Lip seal test

Seal the child’s mouth with masking tape when he/she is distracted or focusing his/her attention on another activity. Progressively increase the time each day until the child is able to breathe only through the nose for, at least, two consecutive hours.
DIAGNOSTIC FEATURE OF ADENOID FACIES

Dennie`s lines- These are horizontal creases seen under both lower eyelids (first described by the American physician Charles Dennie).

- A nasal pleat- Horizontal crease just above the tip of the nose produced by the recurrent upward wiping of nasal secretions.
- Allergic shiners- These are bilateral shadows under the eyes produced by chronic venous congestion. Also, upward wiping of nasal secretions with either the palm or the dorsum of the hands is often called the “allergic salute”.
- Adenoid facies may be part of Cowden syndrome.
MANAGEMENT

• Distinguish Habitual, obstructive or anatomic

• Treat and eliminate the underlying cause or pathology that has created the habit.

• This should be followed by symptomatic treatment.
TREATMENT CONSIDERATION

• Age of the patient

• As with any other habit, correction of mouth breathing could be expected as the child matures.

• As the child grows, obstruction caused due to enlarged adenoids is relieved.

• Self- corrects after puberty
• ENT EXAMINATION:
  • An otolaryngologist examination: tonsils, adenoids or nasal septum.
  • In some children, it may be habitual.

• CORRECTION OF MOUTH BREATHING:
  • Mouth breathing should be treated during the mixed dentition period to prevent or correct its ill effect on occlusion.

• SYMPTOMATIC TREATMENT:
  • The health of the gingiva has to be restored in mouth breathers by applying petroleum jelly, and by correcting any periodontal defects that is caused due to the habit.
- Elimination of cause
- Interception of habit
- Correction of malocclusion
ELIMINATION OF CAUSE

- Etiological agents should be treated first. Removal nasal or pharyngeal obstruction by surgery or by local medication. If a respiratory allergy is present, it should be brought under control.
- If adenoid hypertrophy is present, beta lactamase antibiotics like augmentin and clindamycin is prescribed.
- Homeopathy treatment
- Surgical interventions
INTERCEPTION OF HABIT

• EXERCISES

• MAXILLOTHORAX MYOTHERAPY

• ORAL SCREEN
BREATHING EXERCISE

• Deep breathing exercises are done with inhalation through the nose with arms raised sideways.

• After a short period, the arms are dropped to the sides and air is exhaled through the mouth.
CHEEK EXERCISE

EXERCISE BY WIND INSTRUMENTS
Macaray in 1960 constructed an activator out of aluminium with which development of dental arches and dental base relationship could be corrected.

This stable aluminium activator is incorporated at the angle of the mouth, with horizontal hooks to which expanding rubber bands are attached.
• The mouth breather holds the activator in the mouth, and at the same time with left and right arms alternatively carries 10 exercises 3 times a day.

• Child stands with his back against the wall, raises and lowers on his toes in time to the expander exercises holding the lip tight together and carries out a lightly forced breathing technique in front of an open window.
ORAL SCREEN

• Simple and versatile myofunctional appliance used in early interceptive treatment of dental arch deformities.

• First introduced by Newell in 1912.

• Later advocated by Hotz (1980), Fingeroth (1958) and Nord (1959)

• Works on the principle of force application and force elimination of circumoral musculature
• **DEFINITION**

• **Graber:** An appliance that utilizes the musculature to control abnormal muscle habits and aids in correction of the developing malocclusion.

• **Phillip Adams:** A removable appliance, used to deflect or eliminate muscle forces on certain teeth. Commonly placed in the vestibule between the lips, cheeks and the teeth.
• **Indications**

• Habit-correcting appliance

• It helps retrain and strengthen lip action

• Lip exercises are possible with oral screen, which improves the tonicity of the lips - Hotz modification

• To correct simple labioversion of the maxillary anterior teeth.

• **Contraindication**

• It should not be used if the child has naso-respiratory distress or a nasal obstruction.
USES

1) Mild distoclusions, with premaxillary protrusion and open bite in the deciduous and mixed dentition.

2) Correction of habits like mouth breathing, thumb sucking, lip biting, lip sucking, tongue thrusting.

3) Correction of flaccid, hypotonic orofacial musculature
MECHANISM OF ACTION

- The screen prevents the oro-facial muscle pressures to act on developing dentition causing passive expansion of the dental arches by normal tongue pressure.

- The lip pressure is directed towards the incisors cause in lingual movement of the proclined teeth.

- The construction bite is taken directly in the patient’s mouth by moving the mandible forward within 1-3 mm and the bite is opened 2 mm. So forward positioning of developing mandible is possible.

- Hypotonic lips are activated and thus improved by this specific appliance
FABRICATION

- Upper and lower impression taken
- Working models of normal occlusion or protrusive bite (Class II div I)
- Cover the model with 2-3 mm of wax
- Distal surface of first permanent molars - permanent dentition
- Distal surface of second deciduous molar - deciduous dentition
- Processed with either heat cure or self cure acrylic and polished
MODIFICATIONS

• Hotz modification- Anterior loop made of SS wire

• Screens with breathing holes [Kraus (1956), Fingeroth (1958)]

• Double oral screen [Kraus 1956, Selmer-Olsen 1975]

• Rehak’s modification- pacifier attached with screen

• Sanchit goyal modification

• Modification by Kar et al
HOTZ MODIFICATION

• Hotz added a loop made of stainless steel in the anterior aspect of the screen. Patient pulls the loop and resists the displacement of the appliance with lips simultaneously.
SCREEN WITH BREATHING HOLES

- The use of three small holes at the inter incisal level in the anterior portion of the vestibular shield enhances wear for patients who have difficulty breathing through their nose.
- Habitual mouth breathers adjust better with this modification.
- The holes can be gradually reduced after the patient becomes accustomed to the appliance, which stimulates nose breathing.
DOUBLE ORAL SCREEN

• Additional screen placed on the lingual aspect - tongue thrusting
• In this modification a pacifier is attached with the screen which projects out from the outer part of the oral screen. The pacifier has to be retained by the lips, therefore improve the hypotonic lips.
• To reduce the acrylic bulk with ovoid and criss cross wire.

• Distal loops joined with each other- protective barrier, prevents cheek injury
FABRICATION

- Working models placed in normal occlusion or protrusive bite (Class II div I)
- Wax up of the appliance
- Depending on the need of treatment, incisal third of anterior teeth may or may not be covered with 1-2 mm wax.
- Posterior segment- not influenced directly
- 2 loops (19 gauge SS wire) fabricated; distal end of loop soldered and joined together
- Outer loop extending up to distal end of first permanent molars or last erupted molars
- 2-4 mm clearance between loops and buccal surface
9 yrs old, Male
CC- Malocclusion
C/E- proclined upper anteriors and mouth breathing
RX plan- Modified oral screen. Lip exercise
Oral screen - To wear every night and day time whenever possible
Lip seal exercise - 30-45 min/day
Regular check up interval - 3-4 weeks
PRE-ORTHODONTIC TRAINER

• Appliances used in mixed dentition period for myofunctional correction and tooth eruption guidance
• Provides end-end incisor relationship by positioning mandible anteriorly
• Provides more balanced face muscle structure by training tongue and lip muscles
T4K TRAINER

- Prefabricated appliance for 6-11 yrs of age

- For preparation to orthodontic treatment, for correction of myofunctional habits and for eruption guidance

- Eliminates muscular factors in etiology of malocclusion
• Can be used in class II cases with mild anterior crowding, anterior open bite, mild class III cases, in presence of habits

• Patient asked swallow with appliance in mouth, while lips are closed and tongue-tip on the tongue tag

Design characteristics of the T4K® Phase 1

1. Tooth Channels and labial bows - guide erupting teeth into correct alignment.
2. Tongue Tag - trains the tongue to sit in the roof of the mouth, improving myofunctional habits.
MAXILLARY EXPANSION

Expansion of maxilla improves nasal volume and nasal flow thus alleviates the symptoms of upper airway obstruction.

Four techniques for expanding narrow maxillae:

(a) expansion by orthodontic technique e.g. use of quad-helix appliance

(b) rapid maxillary expansion (RME)

(c) a hyrax screw or palatal distractor is used

(d) surgically assisted orthodontic maxillary expansion - transverse segmental osteotomy
• Oral orthodontic appliances such as mandibular advancement devices are used which enlarges the upper airway and prevent its collapse by displacing the mandible forward.
This advances the mandible, widens the airway and relieves the symptoms of upper airway obstruction.
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THANK YOU