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Mouth breathing: An update

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Abstract
Mouth breathing as an oral habit is seldom discussed in detail and as a consequence has tended to be overlooked by dental professionals. Early diagnosis is a key to treatment. A pediatric dentist may be one of the first healthcare professionals to come in contact with a patient who exhibits mouth breathing and thus it is important to have a sound knowledge to perform correct diagnosis and effective treatment. Present review of literature includes etiological factors, clinical features, pathogenesis, diagnosis and management of mouth breathing patients.

Keywords: oral habits, mouth breathing habit, nasal obstruction, obstructive sleep apnea

Introduction

The mouth does not usually contribute in respiration. For usual dentofacial growth to happen there ought to be normal breathing. Increased struggle to the flow of air through the nasal passages may be considered to be the key reason of mouth breathing. Mouth breathing is defined as "habitual respiration through the mouth instead of the nose". An important function of the nose is the preparation of the atmospheric air for use by the lungs. The nose cleans, moistens and warms the inspired air. Failure to do so, by breathing through the mouth instead of the nose, has been considered to be injurious to the tissues lining the respiratory tract and oral cavity because of the impact of cold, dry and dirty air. It has also been stated that mouth breathing has serious effects on the development of the facial skeleton and the occlusion of the teeth because of the displacement of normal labial, buccal and lingual muscular forces [1].

A number of persons may appear to be mouth breathers because of their mandibular posture or incompetent lips. It is common for a 3 to 6-year-old to be slightly lip incompetent. Other children have been labeled mouth breathers because of a suspected nasal airway obstruction. When nose breathing is disrupted by adenoid and tonsil hypertrophy, rhinitis, nasal septum deviation, there is a prevalence of mouth breathing [2] How, when and why to treat such patients is very important for a pedodontist. This review includes etiological factors, clinical features, pathogenesis, diagnosis and management of mouth breathing patients.

Classification [2]

Sim and Finn (1987) classified mouth breathing as –

- **Obstructive:** Children with an increased resistance to or a complete obstruction of the normal flow of air through the nasal passages. Seen in ectomorphous individuals with long narrow faces and nasopharyngeal passages.
- **Habitual:** Child who continually breathes through the mouth by force of habit, although the obstruction has been removed
- **Anatomic:** Short upper lip does not permit closure without undue effort.

Etiology [3, 4]

There could be many reasons which can cause mouth breathing; usually they are related to oro-nasal structures. Few to mention are –

1. **Developmental anomalies**
   - Short upper lip
   - DNS, tumor – obstruction
2. **Inflammation of nasal mucosa**
   - Chronic allergic stomatitis
   - Enlarged adenoids, tonsils
3. **Nasal polyps**
4. **Obstructive sleep apnea**
5. **Trauma to oro-nasal structures**
6. **Genetic pattern:** Some children are genetically determined to be inclined towards being ectomorphic children, who are more prone to show this habit.
7. **Habits:** Thumb sucking can act as instigating agents for this habit. With downward and forward maxillary growth there is a drop in palatal shelves leading to vertical growth of nasal cavity. But in thumb sucking habit, narrowing of maxillary arch is seen as nasal floor does not drops down vertically to its expected position due to continuous pressure applied by

the thumb. These leads to narrow nasal floor, decreasing the nasal air volume and predisposing the child to mouth breathing.

8. **Enlarged Tonsils & adenoids**

Clinical features [3, 5, 6]

The clinical features of a mouth breather could be divided in following headings

- **General findings**

Usually mouth breathers have their neck bent forward as it straightens the oro-naso-pharyngeal path and help in easy breathing. They also have "Pigeon chest" like appearance due to over work done by diaphragm and intercoastal muscles in mouth breathers. Esophagus does not have its own secretory glands. For moistening it depends on oro-pharyngeal glands secretions. In mouth breathers oro pharynx is dry and hence this dry esophagus often shows a low grade esophagitis. Narrowed maxilla and nasal cavities are also seen.

- **Oro-nasal findings**

These patient shows same kind of features of various degrees comprising of -

- Low positioned tongue
- Narrow maxillary arch
- High vault
- Protrusion of maxillary and mandibular arch
- High caries especially in anterior segment
- Anterior open bite
- Tenacious mucous and plaque
- Gummy smile
- Hypertrophic gingivitis

Diagnosis [3, 7, 8, 9]

- Observe the patient
- Check how the patient is keeping her/his lips at rest
- 3–6 years of age is considered to be have slightly lip incompetent as the development of lip lags behind a little from rest of the dento facial skeleton [3].
- History: Ask parent about his lip posture at rest and also enquire about frequency of tonsillitis, allergic rhinitis and otitis media.
- Examination: Patient is asked to breathe deep from the nose and the changes in the size of external nares are checked. Nose breathers usually have good control of alar muscles so the size does not change while breathing unlike in mouth breathers.

Mirror/ fog test: This test can be used to check whether the patient is breathing through the nose or mouth depending on which side of the mirror gets foggy.

Massler's water holding test: Patient is given some water in glass which he is asked to hold in the mouth without drinking or spitting it out. If patient is compulsive mouth breather he will soon have discomfort in retaining the water in mouth.

Zwemer's butterfly test: A piece of cotton is made in butterfly shape and kept in front of the nose and mouth. Type of breathing can be assessed depending on which side of the cotton shows fluttering. For this test, patient eyes should be closed and room's fans should be switched off. Modification of this test can also be used to determine any unilateral blockade in nostrils.

Rhinometry (inductive plethysmography): One modification of this method has been used by Fischer in 1994. This technique was called as acoustic rhinometry. In this method the audible sounds are produced due to breathing patterns which were assessed by a sensor placed near patient's nose. This type of sound was used to determine the type of breathing.

Lateral cephalogram: Lateral cephalogram is yet another very important tool in diagnosing the mouth breathing. It not only tells about the size of adenoids, the nasopharyngeal airway, lingual tonsils but it also tells about the dento-skeletal changes that have taken place due to this habit.

Treatment [10, 11, 12]

Before deciding on the mode of the treatment in such cases, age of the child is the most important factor which should be taken care of. As lymphoid tissue hypertrophy often get corrected post puberty.

To clear such factors, an ENT referral and evaluation becomes another very important step in management on mouth breathing. The type of mouth breathing should be clearly classified before choosing the treatment modality.

The treatment plan can be done in following 4 phases –

- Elimination of the cause
- Symptomatic treatment
- Interception of habit
- Correction of malocclusion

Elimination of the cause

- Nasal or pharyngeal blockade if present should be treated by surgery or medication as advised by the otolaryngologist.
- Rapid maxillary expansion has been considered as an option to increase the nasal cavity volume and in turn easing the nasal breathing.

But a low-level of evidence between RME and correction of mouth breathing has been found in the review article written by Kilic in 2008.

Symptomatic treatment

- This mainly includes treatment for gingivitis and periodontitis already caused.

Lip exercises

- Lip exercises should be advised to such patient as they often have short upper lip.
- If anterior proclination is seen along with short upper lip, the exercise is modified slightly in which patient also applies force with his upper lip in posterior direction which could help in reclining the incisors.
- This exercise is called as lip seal exercise by Frankl in 1980.

Oral screen

- It is a simple functional appliance that makes the form of a curved shield of acrylic placed in the labial vestibule. It was first given by Newell in 1912.

- This type of appliance is used for habitual type of mouth breathers and full night wear is usually advised.
- This works on the principle of force application and elimination. The force is applied on the incisor area to retract and force is eliminated from buccal segment to prevent contraction of maxillary arch posteriorly.

Plexiglass

This type was described by Hitchcock. Both casts fixed in occlusion and a paper pattern is made, cut the sheet to shape it. Heat gently with Bunsen burner and as the sheet slumps, press with wet towel to adapt it.

Heat labile plastic oral screen

It is the most rapid and clean method. Fix both casts with rubber band and no separating media is applied. Make paper pattern. Use Omnivac vacuum and heating machine to adapt it over the cast. This is chilled, cold sterilized and ready to be delivered.

Maxillo-myotherapy

These expanding exercises are used in conjunction with the Macaray activator. This stable aluminium activator is incorporated at the angle of mouth; with horizontal hooks to which expanding rubber bands are attached. Mouth breather holds the activator in the mouth and at the same time with left and right arms alternatively caries out ten exercises thrice daily.

Pre orthodontic trainer –T4K

This trainer for kids can also be used in correction on this habit. According to manufacturer's instructions holes can be drilled in this appliance also. Full night plus one hour day wear is advised.

Conclusion

Treatment of habits like mouth breathing should always be a team effort which chiefly comprises of otolaryngologist, pediatric dentist and orthodontist. It is also very important for pedodontist to consult the otolaryngologist, regarding the type of mouth breathing patient is suffering and formulate the dental treatment plan accordingly.

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