

# LIP INCOMPETENCE

Robert M. Mason, DMD, PhD

If you were to enter an elementary school classroom, you would expect to see a lot of teeth showing as you talk to the students who are (hopefully) sitting quietly in front of you. Since the lips are not fully grown until age 12 to 13 years, it is commonly a normal experience for many children under this age to rest with lips apart. In this posture, some upper teeth will be evident. Unfortunately, children who have a normal age-appropriate lips-apart rest posture are labeled as having **lip incompetence**, a term intended to describe an abnormal lips-apart rest posture in adolescents and adults.

The term **lip incompetence** is a poor descriptive term that should be changed. The chances of this label being changed, however, appear to be slim to none. At present, **lip incompetence** remains a universally-used term in dentistry and medicine to describe individuals who can close their lips together but are unable to achieve a relaxed, consistent, lips-together rest posture. The lips remain open, with some upper front teeth (maxillary incisors) showing. Why this is described as incompetence is a mystery.

## Why the concern about lip incompetence?

Adolescents and adults are expected to be able to sit at rest with lips slightly touching, or in contact. This rest posture describes lip competence, which is a descriptive label of a normal ability. By contrast, those adolescents and adults with lip incompetence are considered to have a condition that can potentially lead to changes in the position of teeth, especially the upper front teeth (maxillary incisors).



**Adult with lip incompetence. Her habitual rest posture is with lips-apart. This patient cannot keep her lips together without muscle strain.**

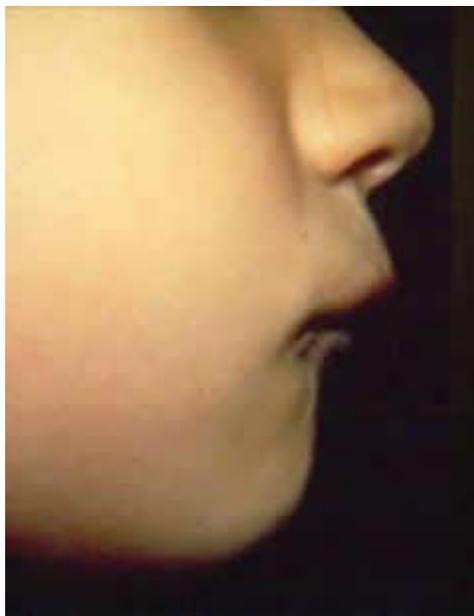
Lip incompetence in adolescents and adults is a common finding accompanying problems of allergic rhinitis or other airway obstructions, or partial blockages such as enlarged tonsils or adenoids. In such conditions, the lips remain open and often, the lower jaw is hinged slightly open as a way of maintaining the oral airway for breathing. Over time, lip incompetence can lead to speech errors and dental alignment changes if the lips-apart rest posture is accompanied by the mandible dropping down slightly to an open position to help facilitate oral breathing. Together, these findings can trigger dental changes of increased eruption of posterior teeth (even in adolescents and adults) that can occur when the resting posture of the lower jaw is increased beyond the normal range for hours per day. Accordingly, dentists become concerned about the presence of lip incompetence when the nasal airway is compromised by allergies or obstructions, since an increased mouth open posture can impact the dentition, even in adults.

A lips-apart rest posture does not need to represent a clinical problem, as exemplified by children under age 12-13, many of whom are not expected to have achieved a lips-together rest posture (lip competence). Children can develop normal dental arches in spite of having had a lips-apart rest posture in their early school years.

### **Growth of the lips**

Vig and Cohen (1979) documented the growth of the upper and lower lips. Lip growth proceeds primary in the vertical dimension; that is, the upper lip and supporting vertical musculature grow downward, and the lower lip grows upward. As vertical lip growth progresses, the separation between the lips decreases. By age 12 to 13 years, the lips will have undergone sufficient vertical growth to achieve a lips-together resting relationship. Lip growth continues until around age 17 (Vig and Cohen, 1979), so many individuals with lip incompetence at age 13 may develop a spontaneous lips-together rest posture by age 17.

In patients with true lip incompetence, muscle strain is seen over the mentalis muscles as lips are brought into contact; that is, muscle dimpling/buckling is observed in the skin overlying the vertically-positioned mentalis muscles. These muscles are located lateral to and below the corners of the lower lip extending downward to an area lateral to the chin. By contrast, a normal lips-together rest posture does *not* involve the mentalis strain that characterizes lip incompetence.



**The patient shown here has lip incompetence. His habitual rest posture is with lips apart, not closed as done forcefully for this photo. In this case, the child has an excessive overjet (the upper front teeth project forward much farther than the lower front teeth) causing this child to struggle to close his lips; something he cannot do without muscle strain.**

Orofacial myologists deserve much credit for the current focus on the identification and treatment of floppy, flaccid (soft, weak, lax, lack of normal muscle tone) lips that account for lip incompetence in many individuals. The lower lip is more likely to show flaccidity than the upper lip. A flaccid lower lip that lacks adequate muscle tone will appear not only droopy, but the vermilion of the lip will roll forward. The medical term for this is "eversion" (turning outward) of the lower lip.

The results of therapy in which the lips and surrounding musculature are strengthened with therapy have been documented in the literature. Studies by dental specialists Barber and Bonus (1975) and Ingervall and Eliasson (1982), using acceptable standards of evidence and control groups, show that lip seal and lip morphology (form and structure) can be positively modified by orofacial myofunctional therapy. When a lip seal is achieved in therapy, the question arises whether this result amounts to “growing” lips. While this question remains unresolved, there is no doubt that lip separation can be reduced or eliminated with orofacial myofunctional exercises. The many patients with lip incompetence who achieve a lips-together rest posture with therapy include those individuals with flaccid lips who respond especially well to the therapy techniques of orofacial myologists. Such patients do not often develop lip competence spontaneously over time. They will need therapy intervention.

Vig and Cohen’s research also documented the normal resting relationship between the lower lip and the upper incisors. This relationship is especially relevant to orthodontic treatment, as will be explained below. Normally, the lower lip at rest overlaps 2 to 3 millimeters (mm) of the upper incisors (you will recall that there are 25 mm in an inch). What this means is that the inner surface of the lower lip normally maintains a resting contact with the lower margins of the upper incisors. This relationship is separate from whether or not there is lip competence or incompetence with the upper lip.

As you read this, your lips are probably touching together lightly while your teeth are slightly apart, rather than being in contact. You can check this on yourself by maintaining this rest posture and pushing lightly inward and upward against the vermilion (colored portion) of your lower lip. You should be able to identify that the uppermost part of the inside of your lower lip covers and overlaps a few mm of your upper incisors. (If this is not the case – don’t panic and call your dentist!!).

The slight teeth-apart resting position of the teeth is termed the dental freeway space. If the freeway space is closed for hours per day; that is, if an individual is a dental “clencher”; who maintains a teeth-together relationship as the basic rest posture, pain and trauma will eventually result in the muscles of the jaws (the muscles of mastication). By contrast, resting with the teeth apart beyond the normal freeway space, which is a rest relationship of just a few mm of opening between the molar teeth, the open-beyond-the-normal-range freeway space will eventually lead to continued dental eruption and can develop into a host of dental alignment problems. For these reasons, especially linking a lack of lips-together at rest with issues involving an abnormal rest position of the lower jaw, the term lip incompetence expresses such concerns very well.

### **Other complications of lip incompetence**

The observation of lip incompetence often leads to an additional, and often inaccurate, diagnosis of mouth breathing. Mouth breathing, like lip incompetence, represents a condition that implies a problem, since the normal breathing mode is nasal breathing, not mouth breathing.

Mouth breathing is characterized by hinging the mandible open and having a predominately oral breathing pattern. Most mouth breathers also have some ability to breathe nasally, but with various nasal obstructions and nasal debris from colds, allergies, or poor nasal hygiene (which characterizes many children who have to be taught to blow their noses), mouth breathing can contribute to changes in facial growth and dental alignment. These variations can develop when the dental freeway space is open beyond the normal range for hours per day. As mentioned, this occurs with the mandible open, even slightly beyond normal, for extended periods.

The unfortunate aspect of mouth breathing is the tendency to mislabel this condition on the basis of only observing that the lips and mouth are open at rest. It should be obvious to all that a lips-apart rest posture is not the same thing as mouth breathing. To properly diagnose mouthbreathing, which by definition is a physiological event, an assessment of airflow should be made through the nose and mouth. To do so necessitates aerodynamic or airflow instrumentation not available in most clinics. When airflow instrumentation is not available, clinicians use other means to assess and diagnose mouthbreathing, such as assessing patients by asking them to first blow their nose to remove nasal debris, and requesting them to keep their lips closed for a few minutes while they are checked for muscle strain below the lips. The ability to maintain a lips-together posture while breathing nasally is also assessed.

### **Lip incompetence and orofacial myology**

Orofacial myologists are interested in evaluating and addressing lip incompetence for a variety of reasons and possible accompanying findings, foremost of which is a mandible hinged open beyond the normal rest position that increases the dental freeway space. Recapturing a normal resting dental vertical dimension is a primary goal of orofacial myofunctional therapy since this clinical situation can negatively influence dental eruption and facial growth.

An abnormal, forward, interdental rest posture of the tongue often accompanies lip incompetence. In orofacial myofunctional therapy, achieving a lips-together rest posture through muscle resistance exercises can also result in repositioning the tongue at rest into a normal position.

Lip incompetence is often accompanied by tongue thrusting during speech or swallowing. Therapy to achieve a lips-together rest posture of the lips, with accompanying therapy to normalize the vertical dimension (freeway space) often results in the spontaneous reduction or elimination of tongue thrusting during both swallowing and speech without ever having to work specifically on the thrusting.



### **Lip incompetence in an adult female related to long-standing allergic rhinitis.**

The scenarios described above demonstrate why orofacial myologists pay close attention to lip incompetence, a finding that has become an important aspect of evaluation and treatment planning in orofacial myofunctional therapy. For clinicians to properly evaluate the potential consequences of lip incompetence, knowledge of the growth of the lips is of paramount importance. Orofacial myologists are well-versed in understanding the possible complications involved.

It should be no surprise that adolescents and adults whose lips are fully grown often retain a lips-apart rest posture. Lip incompetence in these groups can be the result of unresolved airway issues and allergic rhinitis, or can be a retained habit pattern that did not

spontaneously adapt when the ability to maintain a lips-together posture was achieved with growth. Such individuals will benefit from orofacial myofunctional therapy.

Children are notorious for having poor nasal hygiene. This should not be a surprise to parents since they already know that children often have poor oral hygiene and have to be reminded to properly care for their teeth. Many parents reading this will recall the experience of their child sniffing at the dinner table and having to be told to leave the table to blow their nose. This is an example of the reality that many children have to be taught to properly monitor and clear the nasal chamber of debris; that is, to blow their nose as needed!

### **Lip incompetence and orthodontics**

As an orthodontist, I can report that lip incompetence in adolescents and adults represents an observation that is recorded on my orthodontic evaluation problem list and can be of concern during and following orthodontic treatment. Since the usual age of treatment is 12-13 years, many patients in this age range will not have habituated a lips-together rest posture or, they may retain true lip incompetence if lip growth has lagged or is deficient. Lip incompetence, either related to growth or habit, is of special concern to orthodontists after braces are removed.

If at the end of treatment I have achieved a resting relationship of the lower lip overlapping 2-3 mm of the upper incisor teeth – whether or not there is lip competence, I will have no concerns that the upper front teeth retracted during treatment will relapse forward. If, however, there is not a rest relationship of lower lip covering 2-3 mm of upper incisor teeth, such patients will undergo a longer period of orthodontic retention until the normal rest relationship of lower lip and upper incisors has been achieved through growth or orofacial myofunctional therapy.

For those patients whose lower lips will never achieve the normal resting relationship, an extended period of retention is also anticipated for this group, perhaps including fixed retention such as bonded wires behind the anterior dentition. As mentioned above, the upper and lower lips do not need to be in contact for the lower lip to fulfill its proper role of overlapping a few mm of upper teeth at rest. Even in the presence of lip incompetence, the lower lip can provide sufficient retention of the orthodontic result in orthodontic cases in which the upper dentition was retracted during orthodontics.

### **Summary**

*Lip incompetence, in and of itself, is not a clinical problem.* The observation of lip incompetence in a patient should serve as a sign for clinicians to look carefully for other associated variations. When lip incompetence is coupled with an open jaw rest posture and a forward rest posture of the tongue, speech errors, unwanted facial form and dental eruption and alignment changes will likely follow. The term lip incompetence is an unfortunate label that can be applied (inappropriately) to many growing children. However, the term has considerable clinical relevance when used with adolescents and adults.

Orthodontists and orofacial myologists are concerned about lip incompetence when combined with the factors cited above. Orofacial myologists are skilled at eliminating lip incompetence, correcting tongue thrusting during speech and swallowing, repositioning the tongue at rest, and establishing and stabilizing a normal rest posture of the mandible and a normal freeway space dimension. The overall goal of these therapy efforts is to create or recapture normal orofacial and dental patterns of growth and development. *Therapy cannot be successful until whatever airway interference issues that may be involved are resolved prior to the initiation of orofacial myofunctional therapy. Other areas that should be ruled out prior to therapy are tongue-tie(ankyloglossia), and ankylosis (fixation/immobilization) of the labial frenum (the*

*tissue band between the gums and the inner side of the lip at the midline).*

Orthodontists are concerned about lip incompetence before, during and after orthodontic treatment. If the dentition is set up orthodontically to include a lower lip resting relationship overlapping 2-3 mm of upper incisor teeth, relapse concerns of teeth moving forward are eliminated; however, not all patients will have achieved lip competence at the end of orthodontic treatment. In such cases, a longer period of orthodontic retention is indicated, and the skills of the orofacial myologist may also be enlisted to develop a lips-together rest posture.

Lip incompetence is an example of an important opportunity for a positive collaboration between orofacial myologists and orthodontists. When lip incompetence and associated problems are resolved through orofacial myofunctional therapy, the long-term stability of the orthodontic treatment is reinforced.

### **References**

Barber T.K., & Bonus, H.W. (1975) .Dental relationships in tongue-thrusting children as affected by circumoral myofunctional exercise. *Journal of the American Dental Association*, 90, 979-988.

Ingervall, B., & Eliasson, G.B. (1982). Effect of lip training in children with short upper lip. *Angle Orthodontist*, 52 (3), 222-233.

Vig, P.S., & Cohen, A.M. (1979). Vertical growth of the lips: A serial cephalometric study. *American Journal of Orthodontics*, 75, 405-415, 1979.