



## **The Role of the Jaw for Feeding and Speech**

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The function of the jaw for feeding and speech has long been the discussion of both speech-language pathologists and occupational therapists. This article will examine the relationship between jaw movements or jaw skill levels for feeding quality and speech clarity. What has been missing in our discussions concerning jaw function is the role the jaw plays in the development of speech sounds. Information about how to accurately identify jaw skill and how to treat any deficits which may be present has been vague or left out of assessment and treatment of speech and feeding skills. To aid in the understanding of the jaw and its role in feeding and speech, three diagnostic terms are consistently used in the literature and in therapy programs targeting the jaw: dissociation/differentiation, grading/control, and fixing (i.e., associative movements or lack of dissociation and grading).

The new Oxford American dictionary defines dissociation as “to disconnect or separate” **1**. Therefore, dissociation is the separation of movement, based upon adequate strength and stability, in two or more muscle groups **2**. The term differentiation is more commonly used in the literature and is defined similarly as the increased independence in control of the components involved in a motor task **3**. To achieve differentiated movement or dissociation in the oral articulators, stability at midline is necessary to allow for the extremities to dissociate or move independently from the body. The developmental sequence of motor control begins in the head and neck and later emerges in the trunk and limbs in a cephalocaudal to proximodistal orientation **3, 4**. For example, this sequence begins with the jaw maturing before the lips **5**. Thus stability allows for dissociation and grading.

Grading is defined as the controlled segmentation of movement. It is based upon dissociation and requires maturation and stability within the targeted muscle group or given articulator. Grading is a more refined skill and relies upon the ability to dissociate for subsequent controlled movements of one or more articulators or muscle groups. When a child develops adequate stability in one or more articulators, it allows him the ability to dissociate or differentiate movement for more complex and refined oral gestures. For speech, grading is necessary to move from one jaw height to several others fluidly without losing stability to allow reliant articulators such as the tongue and lips to move independently.

The lack of dissociation and grading is termed fixing. Fixing is an abnormal movement pattern which occurs secondary to reduced stability and is used to compensate for the lack of grading

within a muscle group; fixing inhibits appropriate mobility. Fixing can result when a child relies solely on one articulator or articulator movement **13** (e.g., jaw height) to produce sounds requiring a wider range of jaw movement. This can lead to overuse of individual motor movements for speech production **3**. The reduction or treatment of fixing or associative movements of the jaw must therefore be achieved through practice and experience **3, 14**. Fixing or lack of fluid mobility between levels of jaw height often results when grading is not yet established or when grading is inhibited due to lack of experience, rigidity of motor skills, overreliance upon previously learned skills (e.g., suckling for feeding), and overall low tone or muscle weakness (e.g., dysarthria).

The above definitions and concepts provide the basis for assessing the role of the jaw for speech and feeding tasks. The ability to move the jaw, lips and tongue independently is a prerequisite for normal feeding, oral control, and co-articulated speech clarity **2**.

Coordination of the lips, tongue, jaw for chewing, sucking, and speech is developed later and is task specific **6, 7, 8, 9**. For example, chewing is present by 12 months of age **10** while speech sound acquisition is not complete till the age of 8 years **11**. This is suggested to be due to additional coordination demands of multiple articulators **12**. Motor learning principles teach us children will rely upon earlier developing motor systems such as the jaw before transitioning to more complex and interrelated movements of additional articulators (e.g., lips and tongue). This developmental process is also referred to as integration, differentiation, and refinement **3**.

If the support articulator (the jaw) is not stable and fully developed, subsequent skills of later developing systems will be inhibited. For example, if a child displays jaw instability in the form of extraneous movement (e.g., sliding, jutting, etc.) subsequent lip and tongue movement and placement will be adversely affected.

How do we, as clinicians, then integrate this knowledge into our everyday practice with children displaying jaw instability? The first step is to identify the client's ability to dissociate/differentiate/separate movements of the jaw, tongue, and lips. The second step is to determine if the client is able to grade/control jaw movements to support appropriate dissociation of the lips and tongue. Lastly, if dissociation or grading is observed to be abnormal, the presence of fixing should be determined.

Therefore, dissociation and grading are used in combination to perform the complex movements necessary for safe feeding and standard speech clarity (coarticulation). When dissociation and grading have not developed appropriately, compensatory postures or fixing occurs, which inhibits mobility, thereby inhibiting movements for appropriate feeding and coarticulation. The following picture illustrates levels of jaw height used to produce speech sounds.

Practice and experience through the mediation of therapeutic intervention can guide children through developmental levels of jaw movement in order to produce appropriate speech sounds. Because the jaw is the primary articulator for speech, assessment and treatment, targeting jaw movement for vowel and consonant production may be necessary in the presence of jaw instability.

As stated earlier, jaw stability is the foundation for adequate dissociation and grading of the articulators (jaw, lips, and tongue). The jaw must move fluidly (grade) through each jaw height as a component of speech sound production and more appropriate mobility of the lips and tongue. In addition to assessing jaw grading, it is also necessary to note behaviors that may promote or encourage the lack of jaw stability and grading. These may include thumb sucking, bottle or sippy cup drinking (e.g., suckling motion reinforced), teeth grinding or clenching, dental misalignment, tongue sucking, finger or hand sucking/chewing, etc. Such behaviors and structural components are noteworthy in determining how to assess and treat lack of jaw stability, grading, presence of fixing, and lack of age appropriate dissociation of the jaw, lips, and tongue. When assessing and treating motor systems and motor learning, many things must be considered such as the client's sensorimotor system; structural mechanism; functional use of developmental abilities; compensatory strategies (e.g., fixing); and non-speech abilities such as feeding, oral-management (e.g., saliva management), and oral-motor skills (i.e., volitional and functional).

Jaw stability is the foundation for speech production and feeding management. Assessment and treatment of jaw function will provide additional insight to developmental abilities of our clients and how they use existing systems to produce meaningful speech. Assuring jaw stability provides the foundation to achieve more complex movements for later developing speech sounds and coarticulation while also providing insight into a child's sensory system and compensatory patterns for speech and feeding.

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