

# ROLE OF THE JAW

## In feeding and speech

By Dawn L. Johnson, MS, CCC-SLP and Jennifer Gray, MS, CCC-SLP

**J**aw stability is the foundation for speech production and feeding management. Movements or skill levels of the jaw are related to feeding quality and speech clarity.

Diagnostic terms used to understand the jaw and its role in feeding and speech are dissociation/differentiation, grading/control and fixing/association. Dissociation is the separation of movement in two or more muscle groups based on adequate strength and stability.<sup>1</sup> Differentiation, which is defined as the increased independence in control of the components involved in a motor task, is the term more commonly used in the literature.<sup>2</sup>

To achieve differentiated movement or dissociation in the oral articulators, stability at midline is necessary to allow for the extremities to 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.<sup>2,3</sup>

For example, this sequence begins with the jaw maturing before the lips.<sup>4</sup> Thus, stability allows for dissociation and grading.

Grading, or the controlled segmentation of movement, is based on dissociation and requires maturation and stability within the targeted muscle group or given articulator. This more refined skill relies on the ability to dissociate for subsequent controlled movements of one or more articulators or muscle groups.

Developing adequate stability in one or more articulators enables a child to dissociate or differentiate movement for more complex and refined oral gestures. Grading is necessary in speech 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.

Fixing is the lack of dissociation and grading. This abnormal movement pattern occurs secondary to reduced stability and is used to compensate for the lack of grading within a muscle group. Fixing inhibits appropriate mobility. It can result when a child relies solely on one articulator or articulator movement, such as jaw height, to produce sounds requiring a wider range of jaw movement.<sup>12</sup> This can lead to the

overuse of individual motor movements for speech production.<sup>2</sup>

Therefore, the reduction or treatment of associative movements of the jaw must be achieved through practice and experience.<sup>2,13</sup> Fixing or lack of fluid mobility between levels of jaw height often results when grading is not established yet or when grading is inhibited due to lack of experience, rigidity of motor skills, over-reliance on previously learned skills (e.g., suckling for feeding), and overall low tone or muscle weakness such as dysarthria.

These 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.<sup>1</sup>



# MOST™

Marshalla Oral Sensorimotor Test™  
by Pam Marshalla, M.A., CCC-SLP



## THE ONLY Comprehensive Oral Sensorimotor Test with Quantitative and Qualitative Values



Pam Marshalla



- Identify specific difficulties—jaw, lip, tongue, respiration, and phonation.
- Measure motor and sensory functions inside/outside the mouth with 21 probes.
- Unique Stimulus Easel—realistic illustrations, easy-to-understand instructions, and scoring system.
- All-in-one kit includes all the OM supplies you need to assess.

Learn more about **MOST™** at [www.superduperinc.com/most](http://www.superduperinc.com/most) or contact us at 1-800-277-8737.

©2008 Super Duper® Publications

Coordination of the lips, tongue and jaw for chewing, sucking and speech develops later and is task-specific.<sup>5-8</sup> For example, chewing is present by 12 months of age, while speech sound acquisition is not complete until age 8.<sup>9,10</sup> This may be due to additional coordination demands of multiple articulators.<sup>11</sup>

According to motor learning principles, children rely on 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 referred to as integration, differentiation and refinement.<sup>2</sup>

If the support articulator 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 like sliding and jutting, subsequent lip and tongue movement and placement will be affected adversely.

The first step of integrating this knowledge into our everyday practice with children displaying jaw instability is to identify their ability to dissociate or separate movements of the jaw, tongue and lips. The second step is to determine if the child is able to control jaw movements to support appropriate dissociation of the lips and tongue.

Lastly, if dissociation or grading is observed to be abnormal, clinicians should determine the presence of fixing.

Dissociation and grading are used in combination to perform the complex movements necessary for safe feeding and standard speech clarity. When dissociation and grading have not developed appropriately, compensatory postures or fixing occurs. This inhibits mobility, thereby inhibiting movements for appropriate feeding and coarticulation.

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 that target jaw movement for vowel and consonant production may be necessary in the presence of jaw instability.

Jaw stability is the foundation for adequate dissociation and grading of the articulators. The jaw must move fluidly through each height as a component of speech sound production and more appropriate mobility of the lips and tongue.

In addition to assessing jaw grading, clinicians need 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, teeth grinding or clenching, dental misalignment, tongue sucking, and finger or hand sucking or chewing.

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, clinicians should consider the sensorimotor system, structural mechanism, functional use of developmental abilities, compensatory strategies, and non-speech abilities, such as feeding, oral-management and oral-motor skills.

Clinicians can gain insight into the developmental abilities of clients by assessing jaw function. Assuring jaw stability provides the foundation to achieve more complex movements for later developing speech sounds and coarticulation while offering insight into the sensory system and compensatory patterns for speech and feeding. ■

#### References

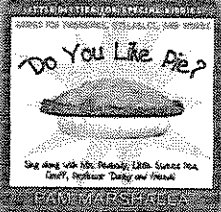
1. Rosenfeld-Johnson, S. (2001). *Oral-Motor Exercises for Speech Clarity*. Tucson, AZ: Innovative Therapists International.
2. Green, R., Moore, C.A., Reilly, K.J., et al. (2000). The physiologic development of speech motor control: Lip and jaw coordination. *Journal of Speech, Language, and Hearing Research*, 43: 239-55.

**Pam Marshalla** M.A., CCC-SLP



*Make Every Session Count!*

**Practical and Effective Articulation Therapy Materials**



**NEW!**  
Children's music CD: Songs for phonemes, syllables, and words!

[www.PAMMARSHALLA.com](http://www.PAMMARSHALLA.com)

## ORAL MOTOR INSTITUTE

FOR THE SCIENCE OF  
ORAL MOTOR TREATMENT

*The OMI is established to publish monographs that demonstrate the scientific basis of oral sensory and motor techniques for articulation and feeding treatment. Its mission is to contribute to the field of speech-language-hearing science by expanding our knowledge about the sensory and motor components of articulation and feeding development, disorders, assessment and treatment.*

Read more at

[www.OralMotorInstitute.org](http://www.OralMotorInstitute.org)

### LATEST MONOGRAPH

ORAL MOTOR TREATMENT VS.  
NON-SPEECH ORAL MOTOR EXERCISES

by Pam Marshalla | 09 April 2008

3. Morris, S.E., Klein, M.D. (2000). *Pre-Feeding Skills* (2nd ed.). San Antonio: Therapy Skill Builders.
4. Herring, S.W. (1985). The ontogeny of mammalian mastication. *American Zoology*, 25: 339-49.
5. Green, R., Moore, C.A., Reilly, K.J. (2000). The sequential development of jaw and lip control for speech. *Journal of Speech, Language, and Hearing Research*, 45: 66-79.
6. Moore, C., Ruark, J. (1996). Does speech emerge from earlier appearing oral-motor behaviors? *Journal of Speech and Hearing Research*, 39: 1034-47.
7. Moore, C.A., Smith, A., Ringel, R.L. (1988). Task-specific organization of activity in human jaw muscles. *Journal of Speech and Hearing Research*, 31: 670-80.
8. Ruark, J.L., Moore, C.A. (1997). Coordination of lip muscle activity by 2-year-old children during speech and non-speech tasks. *Journal of Speech, Language, and Hearing Research*, 40: 1373-85.
9. Green, J.R., Moore, C.A., Ruark, J.L., et al. (1997). Development of chewing in children from 12 to 48 months: Longitudinal study of EMG patterns. *Journal of Neurophysiology*, 77: 2704-16.
10. Sanders, E. (1972). When are speech sounds learned? *Journal of Speech and Hearing Disorders*, 37: 55-63.
11. Bosma, J.F. (1985). Postnatal ontogeny of performance of the pharynx, larynx, and mouth. *American Review of Respiratory Diseases*, 131: S10-15.
12. Kent, R.D. (1992). The biology of phonological development. In C.A. Ferguson, L. Menn & C. Stoel-Gammon (eds.), *Phonological Development: Models, Research, Implications*. Timonium, MD: York Press.
13. Provins, K.A. (1997). The specificity of motor skill and manual asymmetry: A review of the evidence and its implications. *Journal of Motor Behavior*, 29: 183-192.

Sara Rosenfeld-Johnson is the founder of Talk-Tools® Therapies/ITI. She can be contacted at [oromotorsp@aol.com](mailto:oromotorsp@aol.com). Jennifer Gray is on staff at Aspen Editing & Consulting Inc. She can be contacted at [jennifer@aspenediting.com](mailto:jennifer@aspenediting.com). A related article by the authors titled "Oral Habits: Why They Exist and How to Eliminate Them" is available in the Speech and Voice Disorders section of the Speech and Hearing Resource Center on the ADVANCE Web site at [www.advancweb.com/speech](http://www.advancweb.com/speech).

# CHD IN CHILDREN

Schoolchildren who required surgery as infants for congenital heart disease (CHD) run a significant risk of having problems with inattention and hyperactivity and often require remedial services in school.<sup>1</sup>

"These children are at risk for academic and behavior problems," stated researcher Amanda Shillingford, MD, of Children's Hospital of Philadelphia. "It is important to provide ongoing follow-up and neurodevelopmental screening."

Researchers studied 109 children, ages 5-10, who had surgery for complex CHD as newborns. Nearly half were receiving remedial services at school, and 15 percent were in special education classrooms. The rates of high-risk scores for inattention and hyperactivity were three to four times greater than the general population.

School-aged children with complex


CHD tend to have normal cognitive abilities but are at risk for visual and motor problems and impaired speech, language and executive functioning.

"As survival rates have improved, the important longer-term issue is quality of life for patients and their families as they reach school age and beyond," said Dr. Shillingford. "We hope our findings will help raise awareness about their risk of neurodevelopmental problems."


A next step for researchers is to conduct larger studies with more formalized diagnostic tools. ■

## Reference

1. Shillingford, A.J., et al. (2008). Inattention, hyperactivity, and school performance in a population of school-age children with complex congenital heart disease. *Pediatrics*, 121: e759-67.



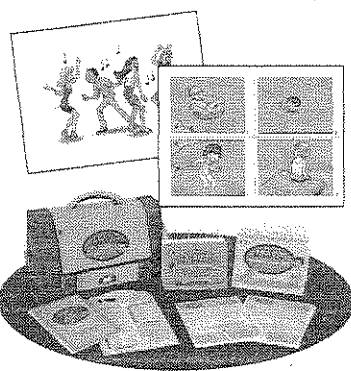
**MAVA**  
Montgomery Assessment  
of Vocabulary Acquisition




**MAVA**<sup>TM</sup>  
Montgomery Assessment of Vocabulary Acquisition<sup>TM</sup>  
by Judy K. Montgomery, Ph.D., CCC-SLP

Agas 3;0-12;11

**SAVE MONEY**  
with Dr. Judy Montgomery's all-in-one  
**Expressive AND Receptive Vocabulary Test!**  
(only \$299)



- Evaluate a child's knowledge of **basic** (tier one), **high-frequency** (tier two), and **curriculum-based** (tier three) words.
- Create **intervention goals** using the unique online **Qualitative Response Analyzer**.
- Assess a child's **listening and speaking vocabulary**—an excellent predictor of literacy skills.



Judy Montgomery

Learn more about **MAVA**<sup>TM</sup> at [www.superduperinc.com/mava](http://www.superduperinc.com/mava)  
or contact us at 1-800-277-8737.

©2008 Super Duper® Publications