Brain Disorders/Neurological

The Importance of Postural Control for Feeding

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Abstract and Introduction

Abstract

Children with cerebral palsy and other neurodisabilities often have decreased postural control that exacerbates their feeding/swallowing disorders. Correct postural alignment is important in the normal feeding/swallowing process. In the child with cerebral palsy, the alignment and stability of the oral structures for feeding/swallowing may be compromised by abnormal muscle tone and movement patterns. Effective oral functioning for feeding begins with attaining better head stability to improve jaw control. Head control is influenced by trunk alignment, which depends upon the stability of the pelvic area. Techniques such as therapeutic seating and oral control can enhance postural alignment and improve oral functioning for the safe intake of food.

Introduction

The pediatric nurse often has the initial therapeutic relationship with the family of children with neurogenic disorders. This may be in the hospital, the pediatrician's office, or through home-health services. Because of the trust that develops through this relationship, the information given by the professional nurse is attended to and valued by the family. Through their recommendations then, nurses have a unique opportunity to influence the development of the child's feeding behaviors. These recommendations should be an outgrowth of thorough understanding of the deficits that interfere with successful feeding and realistic modifications that can help remediate them. Knowledge regarding posture and its influence on the feeding/swallowing process will enable the nurse to provide recommendations that enhance the safety of feeding and may help the child progress to more developmentally mature stages of oral control.

Posture and Normal Feeding

Alignment of the oral structures for feeding is related to head and trunk stability (Bosma, 1972, 1986; Langley & Thomas, 1991; Robbins, 1992). It is well documented that the child's head position influences the swallow during feeding and reduces the risk of aspiration (Larnert & Ekberg, 1995; Logemann, 1998). The recommended head posture for safe swallow is a "chin tuck." The head is upright, in midline, with neck flexion, so that the chin is directed slightly downward and inward.

Head position is dependent on trunk control (Herman & Lange, 1999; Langley & Thomas, 1991; Seikel, King, & Drumwright, 2000). To achieve this alignment of the head with the trunk, the pelvis must be stabilized. This has important consequences for the entire process of swallowing. If the head is not stable, then the fine movements of the jaw and tongue needed for feeding will be impaired (Jones-Owens, 1991; Seikel et al., 2000). Thus, it appears that structures that are significantly distal to the oral area influence its functioning (see Figure 1).

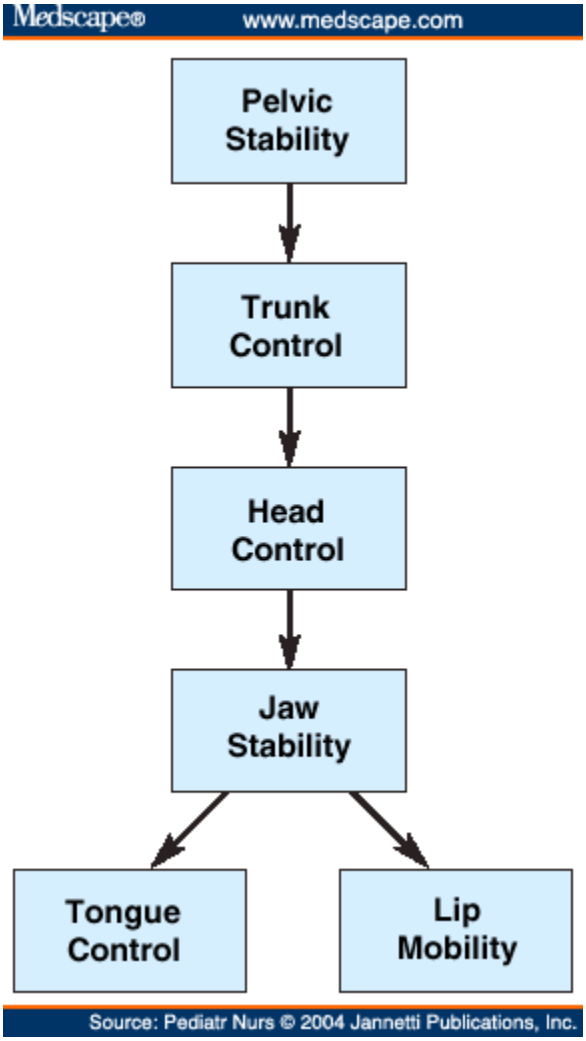

Figure 1. The Influence of Pelvic Stability on Oral Control for Feeding

The normal child may readily compensate for misalignment during feeding. However, for the child with neurodisability any variation from the ideal head and trunk alignment may result in oral processing difficulties that will compromise eating and swallowing.

Feeding Issues of the Child with a Neurodisability

Many of the children with neurodisabilities are those who are, or who will be, diagnosed with cerebral palsy (CP). They may have been premature infants. They present with abnormal muscle tone and reflexes that compromise feeding. The resulting oral sensorimotor deficits interfere with the oral processing of food. In fact, the prevalence of feeding disorders in various samples of children with CP have been reported to be as high as 80% (Rogers, Arvedson, Buck, Smart, & Msall, 1994), with aspiration occurring in about 25% of these children (Arvedson & Brodsky, 2002). Frequent aspiration, of course, is but a symptom of underlying pathophysiology. Oral-motor and lingual incoordination (Arvedson & Brodsky, 2002; Daniels, Brailey, & Foundas, 1999); poor coordination between breathing and swallowing (Couriel, Bisset, Miller, Thomas, & Clarke, 1993); and poor alignment of head, neck, and trunk (Arvedson & Brodsky, 2002; Larnert & Ekberg, 1995) may be underlying causes of aspiration in children with cerebral palsy.

Successful processing of food relies on coordinated movements of the tongue, lips, and jaw, which depend on the gross motor foundation of head and trunk control (Jones-Owens, 1991; Mueller, 2001; Morris & Klein, 2000; Pinder & Faherty, 1999; Seikel et al., 2000; Stevenson & Allaire, 1996). Children with CP lack this foundation and, thus, are unable to move their head independently. This is one of the reasons that their oral movements for feeding are impaired (Bosma, 1992, 1997; Larnert & Ekberg; 1995; Stevenson & Allaire, 1996).

Additionally, children with CP often exhibit hyperextension of the head and neck due to increased muscle tone. Such hyperextension may also lead to tongue retraction (Larnert & Ekberg, 1995), jaw depression (Bosma, 1992; Langley & Thomas, 1991), airway interference (Couriel et al., 1993), and a predisposition to aspiration (Carroll & Reilly, 1996; Ekberg, 1986). Aspiration may be more likely because an extended head position affects the relationship between the physical structures of respiration and gravity. This then affects the coordination needed for swallowing and breathing (Seikel et al., 2000) (see Figure 2). Therefore, one of the nurse's first goals of patient care should be the alignment of the head to an ideal position for safe swallowing.

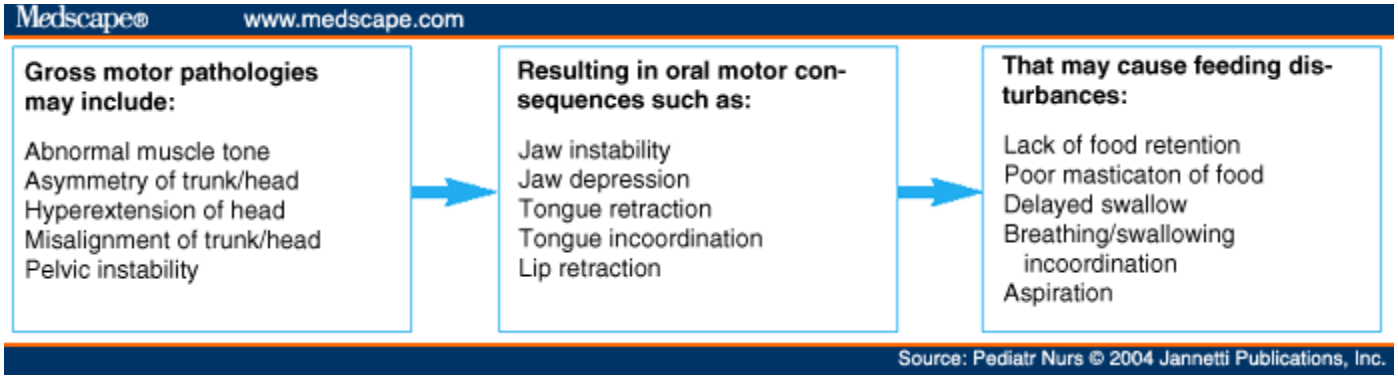

Figure 2. Causes of Feeding Disturbances in Children with Cerebral Palsy

Positioning

Safety and efficiency are enhanced with upright positioning and the use of a chin tuck head posture, which allows food moving from the mouth through the pharynx into the esophagus to be directed away from the airway. This position also provides greater stability of the mandible for improved suck/swallow in the infant. However, maintaining this head posture is problematic in children with neurodisabilities. A more holistic approach that stabilizes the body and aligns the head and trunk will make it easier for the youngster with CP to maintain a chin tuck and will lead to better oral processing of food.

The typical position for bottle-feeding an infant is on the lap. The feeder should help maintain the infant in an upright position with head/trunk alignment with his/her arm and/or body. Additionally, if one of the feeder's legs is raised by placing his/her foot on a small footstool or box, the infant's hip flexion angle will be decreased and hyperextension can be inhibited (see Figure 3).

Figure 3. Positioning an infant on an adult's lap using the adult's thigh as a wedge to inhibit extension. The adult's foot is placed on a stool or foot support, raising one leg.

When developmentally appropriate, usually at about 6-8 months of age, the child should be seated in a seat or high chair. Ideal sitting posture for eating requires the hips, knees, and feet to be at 90 degrees with weight evenly distributed (Hall, 2001; Johnson & Scott, 1993). Again, the head should be at midline with the chin pointed downward slightly. Positioning in a chair allows eye contact with the feeder, facilitates communication, and in general makes feeding time more pleasurable. For those children with extensor patterns that include pushing back with increased muscle tone, the hip-flexion angle can be decreased by placing a wedge-cushion that is wider in the front under the child's knees.

The child's body should be positioned so that symmetry is achieved. Stabilizing the pelvis is fundamental to this posture (Reid, Rigby, & Ryan, 1999), and providing foot support adds to the stabilization. If stability is achieved at the pelvis, then improved control in the rest of the body will be reflected in better functioning (Colbert, Doyle, & Webb, 1986; Herman & Lange, 1999; Hulme, Shaver, Acher, Mullette, & Eggert, 1987; Reid et al., 1999). Although adaptive seating has been described as a "tool" to achieve proper alignment, normal muscle tone (Herman & Lange, 1999), and pelvic stability (Colbert et al., 1986), infants and young children grow so quickly that ordering expensive adaptive seating is usually not a practical option. Often, towels, cushions, and wedges can be used to help maintain symmetry and head flexion, while seat belts may be employed to stabilize the pelvis. The seat belt needs to be tight and well placed, anchored below the seat and should extend over the pelvic region. The belt must never interfere with breathing or go across the abdomen.

A tray on a high chair or any solid surface will help the youngster maintain alignment and trunk stability. Some children will require a higher table to provide greater stability. Additionally, this will allow weight-

bearing with elbows in front of shoulders, which facilitates shoulder girdle stability (Scott & Staios, 1993). Again, providing stability enhances head/trunk alignment, facilitates the chin tuck, and improves oral processing for feeding (see Table 1).

It is striking how often the child's oral stability improves once head and trunk alignment have been attained. However, if the child cannot maintain a chin tuck position (with mouth closure) throughout a meal, the clinician must then provide it more directly with oral control techniques.

Oral Control

Oral control can aid mouth closure; inhibit oral reflexes; and facilitate jaw, tongue, and lip movements for feeding (see Table 2) (Arvedson & Brodsky, 2002; Hall, 2001; Mueller, 2001), while limiting abnormal movements such as jaw protraction and extension. The starting position for feeding is mouth closure with the tongue within the oral area. The feeder can then help the child make fine, graded movements of the oral structures for feeding.

Oral control can be provided from the front (see Figure 4). In this case, the thumb is placed on the chin influencing jaw movements, while the middle finger is under the chin influencing tongue position. Front oral control permits eye contact between the child and the feeder but offers less oral control. It can be used with infants in infant seats or with children attaining fair head control who need a sensorimotor reminder to maintain head or jaw alignment. In general, infants require less oral control than older children. A premature infant's suck is often characterized by disorganization, but abnormal tone may not be apparent. These infants often need just one finger placed to give the mandible (jaw) enough stability to allow the other oral structures to move more efficiently.

Figure 4. Front oral control allows for more interaction between the child and the feeder.

However, to provide oral control for the child with more profound oral-motor difficulties, oral control given from the side allows the feeder greater influence over the movements of the oral structures. In this case, the right-handed feeder uses the index and middle fingers of the non-dominant hand (i.e., left) while standing or sitting on the right side of the child. The dominant hand is employed for feeding. The nondominant arm must go around the back of the youngster's head, and the index finger of this hand is

then placed midway between the lower lip and the bottom of the chin. The middle finger is placed under the chin. These two fingers (that is, the middle finger and the index finger) work in tandem to maintain proper tongue and jaw positioning (see Figure 5). It is important to note that if the middle finger exerts too much pressure, the child may be pushed into an extended head position. This can be avoided if the little finger is placed on the sternum while the middle finger is still under the chin, thus assuring the maintenance of head position. However, it is also imperative that too much control not be exerted. Otherwise, the child cannot move his/her head, and enjoyment of the eating experience will be diminished (see Table 3).

Figure 5. Oral control from the side provides greater control over oral movements.

Conclusions

When infants and children with CP and other neurodisabilities have early feeding difficulties, it is the goal of all disciplines working with the families to increase the child's skill development and provide the safe intake of food. The most basic, essential, and effective treatment for children with neurogenic disorders who have feeding/swallowing problems is positioning of the head/trunk and the oral area. Positioning begins by facilitating trunk and head alignment. Then, oral control may influence the stability and movement of the oral structures needed for feeding.

CE Information

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Table 1. Checklist for Proper Positioning of the Child with Neurodisabilities for Feeding/swallowing

- Is the child upright? : Chair seat and back should be at 90 degrees and child maintained upright.
- Is he/she symmetrical? : Are hips, knees, and feet in 90 degree flexion?
- Are the feet stable? : Feet should be touching the floor. If not, foot support should be provided.

- Is the pelvis stable?
- Is a well-positioned, tight seat-belt being used?
- Has a solid table surface been provided?
- Is the head in a chin tuck position? : If not, check the above items. : If a chin tuck position cannot be attained through postural alignment, then oral control should be administered.

Table 2. Goals of Oral Control

- Attain and maintain closure of jaw and lips
- Grade jaw movements
- Inhibit jaw extension
- Inhibit jaw protraction
- Influence tongue positioning
- Maintain chin tuck position

Table 3. Checklist for Oral Control

Front Oral Control
Sit in front of the child or infant for eye contact Use non-dominant hand Thumb on chin Middle finger under chin
Side Oral Control
Right handed feeder sits on the left side of the child Use non-dominant hand Index finger on chin Middle finger under chin
Don'ts
Don't exert too much pressure Don't push the child into extension

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