*Adapted from the Quality and Safety Education for Nurses (QSEN) Institute.

Combining pharmacologic and nonpharmacologic interventions provides the best approach for reducing pain. Local anesthetic administration is crucial to minimize pain from the procedure and is discussed in the Transmucosal and Transdermal Analgesia section earlier in the chapter. Common systems that do not require needles for providing local analgesics are found in Table 5-12.

TABLE 5-12

Local Anesthetics Given by Systems Without Needles

Agents	Time for Effective Analgesia	Concerns
EMLA (eutectic mixture of local anesthetics) (2.5% lidocaine and 2.5% prilocaine)	60-90 min	Use with caution for young infants (<3 months old) because of possible methemoglobinemia related to metabolism of prilocaine Not effective for heel lancing or finger sticks Vasoconstriction decreases vein visibility May be applied by parent
LMX4 (4% liposomal lidocaine cream)	30 min	Available over the counter May be applied by parent
Synera (lidocaine [70 mg] and tetracaine [70 mg])	20-30 min	Not approved for parent application
Needle-free lidocaine injection device (J-tip) (1% buffered lidocaine)	1 min	Creates a disconcerting "pop" when activated Local hyperemia and minor bleeding Not approved for parent application

Adapted from Oakes LL: *Infant and child pain management,* New York, 2011, Springer Publishing; Pasero C, McCaffrey M: *Pain assessment and pharmacologic management,* St Louis, 2011, Elsevier.

Procedural Sedation and Analgesia

Severe pain associated with invasive procedures and anxiety associated with diagnostic imaging can be managed with sedation and analgesia. Sedation involves a wide range of levels of consciousness (Box 5-6). A thorough patient assessment including the child's history is essential before procedural sedation.