Early Contact and Maternal-Infant Bonding: One Decade Later

Michael E. Lamb, PhD

From the Department of Pediatrics, University of Utah Medical School, Salt Lake City

ABSTRACT. In the last decade, there has been considerable speculation concerning the importance of early skin-to-skin contact between parturient mothers and neonates. This contact is viewed as crucial to the occurrence of maternal bonding, which is seen as a precursor of optimal maternal behavior and thus as a necessary antecedent of optimal child development. In the present review, these conclusions are shown to have been based on equivocal findings obtained in methodologically impoverished studies. Although early contact may have modest but beneficial short-term effects in some circumstances, no positive long-term effects have been demonstrated. Pediatrics 70:763-768, 1982; bonding, attachment, early contact, maternal behavior.

In the last decade, considerable excitement has been generated by the suggestion that events occurring in the immediate postpartum period could have a substantial influence on parental behavior and thus on subsequent child development. Klaus and co-workers1-4 and de Chateau5-7 have argued that there exists in human mothers a sensitive period immediately after delivery during which certain experiences are more likely to produce affectionate attachments or bonds to infants than at any other time. When this “bonding” process is interrupted, warned Klaus and Kennell,1 various forms of aberrant parental behavior, including child abuse and neglect, are more apt to occur and suboptimal child development is more likely. Such claims provided the scientific basis for changes in accepted obstetric procedures, and we owe a great deal to Klaus and Kennell for facilitating the humanization of birthing practices. It is important, however, to evaluate the evidence upon which their argument was based, because their conclusions have far-reaching implications for understanding the determinants of human behavior and development. That is the goal of this paper. For brevity, I will not discuss either (1) the determinants of maternal behavior in other species, although I have argued elsewhere8 that the analogy drawn by Klaus and Kennell is flawed in many respects, or (2) research on early contact with preterm infants, inasmuch as these studies involved contact after the hypothesized sensitive period. Readers are referred to a longer review8 for fuller details, especially those concerning the manner in which mothers in the various groups were treated. Unless otherwise noted, control group mothers were denied contact with their nude infants.

SHORT-TERM CONSEQUENCES OF EARLY AND EXTENDED CONTACT

In the first study, Klaus et al2 allowed a group of 14 poor, predominantly black, unmarried, primiparas one hour of contact with their nude newborns during the first three hours after delivery. These mothers were also given their babies for five additional hours on each of the next three days. One month after delivery, the mothers who had been allowed extended contact were reportedly more reluctant to leave their infants with baby-sitters, more attentive during a pediatric examination, soothed their babies more, and engaged in more fondling and “en face” behavior than did mothers in the control group. These findings provide very little support for claims regarding the beneficial effects of early contact for several reasons. First, only a small proportion of the measures (five out of at least 75) revealed significant differences, so most may have occurred by chance. Thus we can only consider the findings reliable if they can be replicated by other researchers. Second, early contact was confounded with extended contact. Third, the nursing and medical staff members (including the physician who conducted the pediatric examination) were aware that the mothers in the early...
contact group were special, and they are likely to have been treated differently as a result.

In a later study conducted in Guatemala, the same researchers compared three groups: mothers receiving routine care (first contact with clothed baby at 12 hours); mothers who had 45 minutes of skin-to-skin contact 12 hours post partum; and mothers who had 45 minutes of skin-to-skin contact immediately after birth. Thirty-six hours after delivery, mothers who had early contact engaged in more en face behavior (and thus seemed more affectionate) than mothers in the control groups. Although only one of the 19 behavioral measures revealed a significant difference, the specific difference reported replicates the finding reported by Klaus et al and this makes the finding more impressive.

In another series of studies, de Chateau and Wiberg allowed 22 middle-class Swedish primiparas and their infants 15 minutes of extra skin-to-skin contact shortly after delivery during which a midwife helped the mothers establish nursing. These women were then compared with 20 primiparas who experienced routine treatment which involved no skin-to-skin contact. Thirty-six hours after delivery, the groups differed on three of 35 measures (mother sitting up, leaning on elbow, and holding infant) all three of which were measures on which Hales et al found no group differences. These differences do not indicate that the mothers who experienced early contact were more closely bonded, more competent, or more affectionate, and they were found only among the mothers of boys. Furthermore, the babies in the control group cried a great deal more during the observation, leading one to wonder whether group differences were attributable to differences in the infants’ behavior. In sum, the effects revealed in this study were of modest magnitude, unrelated to maternal attachment, and failed to replicate findings obtained in other studies.

Three research teams have attempted to distinguish between the effects of early and extended contact. First, Hopkins and Vietze assigned 104 lower income primiparas and their newborns to one of four treatment conditions: early contact; extended contact (rooming-in); both early contact and rooming-in; and routine care. Some group differences were evident in observations two days after delivery, but there were no differences in affectionate behavior. The number of significant group differences also seems to have been less than would be expected to occur by chance. Second, Grossman et al compared the behavior of primiparous German mothers in four similar groups. Mothers in the early contact groups showed more tender touching and cuddling on days 2 or 3 and 4 or 5 than did mothers in the extended contact and control groups. However, these differences were only observed in mothers who had planned the pregnancy, and there were no group differences seven to nine days post partum. At no point did extended contact appear to have a significant effect. Third, Carlsson et al and Hwang observed Swedish primiparas from diverse socioeconomic backgrounds breast-feeding their infants on the second and fourth days after delivery. Some of the mothers had been allowed to keep their naked infants for one to two hours immediately after delivery, whereas others experienced the regular hospital routine. Whether or not they were allowed extended contact, mothers who experienced early contact showed more contact (ie, behaviors involving physical contact) and fewer noncontact behaviors during both observations. No significant group differences emerged on those measures (eg, en face, touching) on which other researchers have found significant differences. Thus we have a specific failure to replicate, but some support for the value of early contact. These three studies thus suggest that early (although not extended) contact has a short-lived beneficial effect on some mothers. Other studies, however, fail to substantiate this.

Taylor et al observed two groups of middle-class mothers who were allowed different amounts of exposure to their infants after delivery. There were no differences between the groups at two and 30 days post partum on measures of: the amount of time mother and infant spent together; reported maternal attachment; the mothers’ perceptions of their infants; maternal behavior during feedings at 2 and 30 days of age; maternal sensitivity to infant needs; and reluctance to leave the infants with baby-sitters. Mothers and sons (but not daughters) who had early contact were rated higher on “quality of interaction.” Unfortunately, this study provides only a weak test of the hypothesis of Klaus and Kennell because: (1) the mothers in both groups had some early contact; (2) the extra contact in the early contact group only began 30 minutes post partum; and (3) skin-to-skin contact was not provided because the infants were clothed.

In another recent study, Svejda et al observed 30 middle-class primiparas and their infants 36 hours after delivery. Half of the mothers and infants experienced roughly the same contact as those in the study group of de Chateau. When observed interacting with and breast-feeding their infants 36 hours after delivery, however, mothers given extra contact and routine hospital care did not differ on any of 28 specific measures or four composite measures, which included most of the variables used in previous studies of infant-mother bonding.

Another failure to replicate was reported by
Curry, albeit in a small study involving only 11 control mothers and nine study mothers allowed at least 15 minutes of contact with their naked infants within the first hour. These conditions were similar to those in the study of de Chateau and Wiberg, but there were no differences between the two groups of mothers at 36 hours on any of the measures used by de Chateau and Wiberg.

Finally, Anisfeld and Lipper compared mothers allowed one hour of contact at delivery with mothers accorded the normal hospital routine. During a feeding two days later, mothers who experienced early contact were more affectionate. However, they also reported receiving more social support, which suggests that the groups may not have been comparable initially.

**LONG-TERM CONSEQUENCES OF EARLY AND EXTENDED CONTACT**

On the assumption that short-term effects were well established, many researchers have attempted to discern long-term effects. In a one-year follow-up of their subjects, Kennell et al reported that mothers who had been allowed early contact with their infants appeared more concerned and attentive during a pediatric examination than did mothers in the control group. The mothers who experienced early contact also reported being more anxious and more reluctant to leave their infants with baby-sitters. On an unknown but apparently extensive number of behavioral measures scored during free play, picture-taking, interview, and Bayley test sessions, however, mothers in the two groups did not differ. In all, therefore, the vast majority of the measures revealed no group differences. It is impressive, however, that the attitudinal differences evident at one month post partum still distinguished the groups at one year.

Five of the mothers in each group returned for assessments of maternal speech patterns when the children were aged 1 and 2 years. At one year post partum, the control group mothers used more statements. A year later, the mothers in the study group asked more questions, and used more words per proposition, fewer content words, more adjectives, and fewer commands in addressing their children than did the mothers in the control group. Given the sample size, these must be considered as pilot data, rather than serious experimental evidence. The findings, in any event, only show that the speech patterns differed, not that they were better or worse.

At 5 years of age, 19 of the 28 children took three tests of intellectual and linguistic functioning. In the study group, a few measures of maternal speech were significantly correlated with measures of the child’s linguistic competence, whereas these corre-

Because the ratio of significant differences to the number of statistical tests was low (7:140) there was, at best, weak support for the claim that maternal characteristics were associated with the child’s competence only when mother and infant experienced early contact. However, the associations between maternal and child measures did not involve facilitation of the children’s development, as there were no group differences in performance on any test.

In their follow-up, de Chateau and Wiberg found that the early contact mothers kissed and held their 3-month-old infants more in the en face position and cleaned their infants less than did mothers in the control group. In addition, infants in the early contact group cried less and smiled/laughed more than infants in the control group. Of 61 measures, only these five revealed significant group differences. Once again the effects were strongest for mothers and sons, and the interpretation is again unclear: Could differences in infant behavior during the observations have accounted for the differences in maternal behavior? Did early contact create happier dyads? Or were the infants in the control group temperamentally more irritable (remember that they cried more at both 36 hours and 3 months of age) and thus produced differences in maternal behavior? In any event, Curry was unable to replicate these findings in an otherwise comparable study.

One year post partum, the early contact mothers studied by de Chateau and Wiberg held their infants closely more often, engaged in more non-functional touching, and talked more warmly than did the control group mothers. On standardized tests, the children who had received early contact were not significantly more advanced developmentally at 1 or 3 years of age. Compared with control mothers, early contact mothers also reported more accelerated language development, less eagerness to return to work, less paternal involvement, less willingness to give infants rooms of their own, and earlier bladder training. The meaning of these differences is unclear. Further, it seems that only a chance number of the many items assessed revealed significant group differences. In their follow-up, Carlsson and colleagues found that the effects of early contact evident two and four days post partum disappeared by the time the infants were 6 weeks old.

Ali and Lowry studied 100 lower-class Jamaican women, half of whom had 45 minutes of contact immediately after birth, whereas the others first experienced contact nine hours post partum. Mothers were observed during clinic examinations when the infants were 6 and 12 weeks of age. At age 6
weeks, there were no group differences in maternal behavior, whereas at age 12 weeks, mothers in the study group were more likely to stand and watch the examination, more likely to look at their infants while feeding them, and more likely to vocalize to them. These differences may suggest that mothers in the early contact group felt more comfortable with the examining physician; she or he was not blind to experimental condition and may well have behaved differently toward mothers in the two groups. Inasmuch as the differences were not evident at six weeks post partum, furthermore, it seems unreasonable to attribute them to differences in early contact. There were no group differences in the mothers' reported willingness to leave their infants with baby-sitters or in the likelihood of breast-feeding, but the early contact mothers were less likely to use supplementary foods. Overall, it seems that the four significant group differences were derived from 150 comparisons, which is less than would be expected by chance.

In one of the largest attempts to assess the effects of both early and extended contact, Siegel et al.\(^{33}\) studied 321 women, most of whom were black and unmarried. At both four and 12 months post partum, observations and interviews yielded 30 specific behavioral items and 92 ratings which were then factor analyzed. At four months, early and extended contact accounted for only 2.8% of the variance in "maternal acceptance" and 3.3% of the variance in "consoling." At 12 months post partum, early and extended contact accounted for only 3.2% of the variance in "infant positive/negative behavior." Early and extended contact did not affect the likelihood of reported abuse or the utilization of health care services. Contact thus appeared to have a trivial effect on maternal behavior.

By contrast, O'Connor\(^{34}\) reported that, by 17 months, more routine care mothers provided suboptimal care than mothers who had roomed with their infants. The low incidence of child abuse makes the finding difficult to evaluate, however, especially as it was not replicated by Siegel et al.\(^{33}\)

In several later assessments of the subjects of Hopkins and Vietze\(^{35}\) no differences in affectionate behaviors were reported.\(^{36,37}\) Group differences, when found, were not consistent from assessment to assessment and an insignificant number of the many (>100) measures revealed group differences. Again, extended contact in the lying-in period did not have long-term effects.

Anisfeld and Lipper\(^{33}\) observed and interviewed their subjects again three months after delivery. They found that the early contact mothers reported being less eager to place their babies on schedules and more likely to pick up their babies when they cried. Taylor et al.\(^{20,37,38}\) however, found that early contact had no effect on maternal perceptions of infant temperament at age 8 months and had no effect on the security of attachment at age 12 months. Similarly, in their follow-up, Grossman et al.\(^{39}\) found that early contact had no effect on the security of attachment. Rode et al.\(^{40}\) likewise found that mother-infant separations had no effect on the security of attachment among preterm infants.

By contrast, Kontos\(^{41}\) reported that, when observed in free play at home when the infants were 1 and 3 months old, middle-class mothers who had early contact scored much higher on a composite "maternal attachment" index at both ages than did mothers in a routine care comparison group. Unfortunately, all observations were conducted by the author, who was aware of the hypotheses and of the mothers' group status. The potential for bias was thus great.

Instead of the quality of mother-infant interaction, several researchers have examined the effects of early contact on breast-feeding. Sosa et al.\(^{42}\) conducted three such studies involving primiparous Guatemalan women. In all three, mothers in the experimental group nursed their nude babies on the delivery table for 45 minutes before a 12- to 24-hour separation. In the first study, mothers in the control group continued breast-feeding significantly longer; in the second study, the mothers in the study group breast-fed nonsignificantly longer. Unfortunately, the mothers in the control and study groups came from different socioeconomic backgrounds. In the third, smaller, study, the early contact mothers breast-fed significantly longer than mothers in the control group. Only 25% of the mothers in the control group were still breast-feeding at five months post partum, however, whereas a larger survey revealed that 50% usually continued breast-feeding this long. Less than 60% of the study group mothers continued breast-feeding five months, which suggests that, relative to the common cultural practices, early contact had, at best, a modest effect on breast-feeding.

In Brazil, meanwhile, Sousa et al.\(^{43}\) reported that mothers who were allowed to suckle their infants right after delivery and then "roomed-in" with their infants were much more likely to continue breast-feeding for at least two months (77%) than were mothers accorded the normal hospital routine (28%). These results are compromised, however, inasmuch as a "friendly nurse" encouraged and provided advice about breast-feeding to the mothers in the early contact group but not to those in the control group.

Several other studies have explored the effect of early contact on breast-feeding. Johnson\(^{44}\) reported that mothers who nursed during the first hour were more likely to be breast-feeding eight weeks post.
partum than were mothers who first breast-fed (and handled) their infants at 16 hours of age. However, Carlsson et al,31 Vietze et al,36 and Taylor et al20 reported no effects on breast-feeding. De Chateau and co-workers7,28,45 reported that early contact prolonged breast-feeding, but unfortunately there were prenatal group differences in attitudes toward parenting, and the early contact mothers were assisted in breast-feeding.

SUMMARY

The preponderance of the evidence thus suggests that extended contact has no clear effects on maternal behavior. By contrast, some researchers seem to have shown that early contact has positive short-term effects. This conclusion appears premature, however, as serious methodologic problems compromise the research. First, there is the problem of nonreplication. Even though many studies report positive consequences, they usually fail to find effects on similar measures, even when the same subjects are followed over time. Otherwise comparable studies often fail to demonstrate similar effects.

Second, some of the behavioral differences observed appear unrelated to maternal attachment. For example, de Chateau and Wiberg11 in their early (36 hour) assessments only found differences on measures of maternal posture that bear no relationship to maternal attachment.

Third, many of the researchers have employed multiple measures and observed statistically significant differences on a small proportion of these: generally, the number of significant group differences usually hovers around the number that would be expected to occur by chance.

Fourth, many of the studies concerned with effects on breast-feeding are confounded by encouragement or coaching for mothers in the study group. Other studies report no effects. Even if effects were found, they would not demonstrate that early contact affects maternal attachment, for although breast-feeding may facilitate bonding, it is not an index thereof.40

Fifth, it is not clear that any effects observed are accounted for by early contact rather than differences in treatment by medical and nursing staff who know that the study group subjects are special.

Finally, preexisting group differences, as in the Guatemalan sample of Sosa et al16 or the Swedish sample of de Chateau,7 seem as likely as the treatment itself to account for the reported “treatment effects.”

In sum, claims regarding the effects of early contact on maternal-infant bonding are not well supported by the empirical evidence. Early contact has no enduring effects on maternal attachment, but may sometimes have modest short-term effects on some mothers in some circumstances. Unfortunately, we do not know what these characteristics might be, as the evidence is inconsistent or lacking. There is no support for the claim47 that early contact is especially beneficial for young, poor, socially isolated mothers.

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