BRIEF REPORT

Infant Head Molding

A Cultural Practice

Ellen FitzSimmons, MA; Jack H. Prost, PhD; Sharon Peniston

Our research indicates that infant head molding, the application of pressure or bindings to cranial bones to alter their shapes, is prevalent among various Caribbean, Latino, European, African American, Asian, and Native American groups. The data emerged during a cross-cultural anthropological study of child care practices. The documentation of the practice of intentional infant cranial molding, specifically during the first year after birth, has far-reaching implications, particularly for those medical personnel assessing children with dysmorphic crania suggestive of idiopathic craniosynostosis and craniostenosis.

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Intentional head molding producing extreme cranial deformations was once commonly practiced worldwide. Generally, the deformation process involved the application of external pressures, bindings, straps, or pads to the infant's head. By the early to mid-20th century, procedures producing extreme deformations were believed to have been abandoned almost everywhere. A review of recent medical and anthropological literature suggests, by the lack of references to head molding, that all types of intentional alterations in cranial morphological features are exceptional today.[1,2] Apparently, selective manual pressure on the cranium in the form of infant head molding has been ignored by most physical anthropologists and medical practitioners as another possible reason for cranial shape, premature craniosynostosis or craniostenosis, or plagiocephaly.

There are many studies of intentionally and posturally produced head deformation, reaching as far back as the Neolithic and Bronze Ages.[3-7] Infants who were carried on cradle boards, such as Native Americans and Albanians, grew into adults with flattened occipital regions.[8] Occipital flattening has been termed "posturally produced flattening," a condition analogous to positional plagiocephaly due to the supine sleeping position espoused by the American Academy of Pediatrics. Anthropologists have noted that among the Mayans and the Incas, and many northwest coast indigenous peoples, pads and bindings were employed to effect intentionally produced deformations that were signs of high status, ethnicity, or both. That artificial cranial deformation and molding can change skull shape and produce dysmorphic head shapes or premature craniosynostosis and craniostenosis is without debate.[9] Extreme forms of intentional cranial deformation are believed to have been abandoned in most regions of the world by the early to mid-20th century.

Head shape—its genetic basis and external and internal forces affecting it—is of interest to the medical and anthropological communities as well as to the general public. Many physical anthropologists have used head shape, and certain other bony traits, to identify the genetic makeup of certain groups.[8,10] Some physicians have suggested that extreme cases of dysmorphic crania, such as those produced by genetic abnormalities, might lead to brain damage or blindness.[11] Other researchers have stressed the psychosocial ramifications of abnormal appearance due to a dysmorphic cranium.[12] Others have investigated craniosynostosis with reference to cranial capacity.[13,14] Still others have investigated the intrauterine and birth process conditions (womb position, a bicornate uterus, multiple births, and position of the child's head in the birth canal) that may contribute to cranial and facial dysmorphism and craniosynostosis.[15,16] Some researchers have looked into possible correlations between external environmental factors and craniosynostosis.[17] Modern parents and pediatricians, following the American Academy of Pediatrics' 1992 recommendation that infants be placed on their backs or sides to sleep to prevent sudden infant death syndrome, have noted that positional plagiocephaly may develop in infants who sleep

From the Department of Anthropology (Mss FitzSimmons and Peniston and Dr Prost) and the College of Education (Ms FitzSimmons), The University of Illinois at Chicago.

in those positions.[18] Yet, a search of recent medical and anthropological literature reveals only 2 instances in which intentional infant head shaping is even mentioned.[1,2] Apparently, selective manual pressure on the cranium in the form of intentional infant head molding had been ignored by most physical anthropologists and medical practitioners as another possible reason for cranial shape, premature craniosynostosis or craniostenosis, or plagiocephaly.

METHODS

Our ethnographic data on head molding emerged during semistructured interviews with a group of ethnically diverse adults living in Chicago, Ill, Indiana, and New York, who agreed to discuss their traditional child care practices with us. Thirty of them (26 women and 4 men, aged between their mid-20s and 90 years) indicated that they had performed infant head molding, knew how to change the shape of an infant's skull, or knew about the practice. These interviewees were responding to the following survey questions: "Is there anything you do to an infant's head, nose, chin, ears, or palate?" "What do you do?" and "Why do you do that?" The research was conducted according to established anthropological protocol and federal regulations relating to human subject research. Approval of the research protocol was granted by the Institutional Review Board of The University of Illinois at Chicago. Informed consent was obtained from every person interviewed. We videotaped several of the women who consented to demonstrate their head-molding techniques with a doll.

Every one of the 26 women reported that she had intentionally molded her child's head or that her head had been molded when she was an infant to change the shape. Three of the 4 men in our survey said their heads had been molded by a female relative when they were infants to change the shape. The womens' reports on head-molding techniques were graphic and detailed. They included information about (1) when they learned how to mold an infant's head, (2) who taught them the procedure, (3) what to use, (4) for how long, and (5) why the procedure should be done. However, only 1 of the 4 men knew specific details about head-molding procedures.

ETHNOGRAPHIC DATA

All the interviewees said that the reasons they had molded their infants' heads or had heard that women molded infants' heads to change their shape were (1) beauty, (2) health, or (3) intelligence. Beauty was defined as having either a "long face with a long head that's flat in back" (Serbian), a "nice, round head" (Chinese, African American, Filipino, Honduran, Mexican, Guatemalan, Croatian-American, and Italian), a head that did not look like a *cohombro* (cucumber) (Panamanian), and a "round head, but elongated from top to bottom" (Jamaican).

Only 4 informants gave any health-related reason for head shaping. If the infant is vomiting, our Mexican informant said, she was told that pushing up on the palate would stop the vomiting because the pressure pushes up the "soft spot." If the infant refused to nurse and became dehydrated, then upward pressure in the palate is thought to raise the "mole hole" or "mollera" (ie, the open fontanelle), making the infant well (Guatemalan and Honduran). Other informants said that the practice of head molding was simply believed to contribute to an infant's general health (Jamaican and Croatian).

Our Chinese informant stated that head shaping ". . . makes the brain grow right." Our Jamaican informant said that Jamaican mothers attempt to produce a round head "because a broad, flat head is considered stupid." Our Croatian-American informant asserted that the general belief among Croatians is that a round head promoted intelligence.

All of the women reported that they were told and showed how to shape their infants' heads soon after their first infant was born. The lessons typically began when other women gathered to see the infant and to help the new mother. Only women told other women the exact head-molding procedures; generally, it was an older woman who told a younger woman. With the infant as the "educational prop," the new mother was taught to gently push on the cranium to mold the head into the culturally desired form. If wrapping or swaddling was a cultural custom, those techniques were also shown. Our Panamanian informants termed these lessons "lectures," adding that the infant was subjected to the molding "regiment" [sic] at least once daily, generally during his or her bath.

In all but 4 instances, caps of various sorts are mentioned as promoting and maintaining the desired head shape(s) once the hands had been used to begin the process leading to proper bone orientation and curvature. This use of caps to maintain and promote a desired cranial shape is similar in principle to the use of a skull-molding cap as an adjunct to craniosynostosis surgery.[19,20]

The Panamanian, Jamaican, and Honduran informants stated that women customarily cut off the tops of heavy stockings, knotted them, and placed them on the infant's head. The stockings were used "until you saw the right shape coming through." The Croatian-American woman said that a "slightly tight, round, crocheted cap" would achieve the desired form. One Guatemalan informant said that a fairly tight headband was applied. This band is apparently comparable with the band available for remodeling a child's head flattened by sleeping posture.[18,21] Another Guatemalan demonstrated a traditional method of swaddling the infant so that the head was covered by a blanket. The infant is placed in the center of a triangularly folded blanket, with enough material to cover the top of its head. The blanket is then brought down on either side of the head, and the ends are wound tightly around the infant, effectively immobilizing the head and neck. The man of Serbian descent stated that his mother had told him that male infants were placed to sleep on a hard pillow to flatten the back of the skull. All but this last informant maintained that hands were initially used to begin the shaping process.

Rubbing and "smoothing" to change and improve skull shape is often accompanied by oil, egg, or saliva. One or more of 3 sets of movements are typically employed: (1) a circular motion around the entire head, generally with 1 hand; (2) upward pressure from the brow ridges over the fontanelle using one hand while upward pressure from the cranial base over the occipital region, forward along the sagittal suture to the fontanelle, is applied with the other hand; and (3) manual pressure applied simultaneously on either side of the skull with upward movement from the tempo-

ral region to the crown. The particular set(s) of motions used to mold an infant's cranium depends on the informant's ethnic background. When the 3 women in our study talked about their attempts to produce dimples in their infant' cheeks, they said they applied upward pressure on the zygomatic bone, rubbing in a circular motion.

The head molding, in every instance, continues from birth until approximately 1 year of age, after which time "the bones get hard" and ". . . are fixed." Our Honduran informant stressed that a mother should continue the molding routines until the fontanelle closed, a period that, from her experience, was between 8 months and 1 year, "depending on the baby."

None of our informants ever told their pediatricians or primary care physicians about their head-molding practices. Their reasons for not mentioning the practice(s) were uniform. These activities were not topics they thought warranted discussion with physicians because they had nothing to do with illness or disease. All interviewees maintained that head-molding ministrations produced some effect on the child's cranial shape. The Croatian-American informant invited us to examine her "remarkably round, smooth skull."

ANTHROPOLOGICAL AND MEDICAL IMPLICATIONS

Our data lead us to question the validity of using skull shape for racial or ethnic classifications or both. Historically and currently, the ubiquitousness of infant head molding that resulted in various head shapes, even those that might not necessarily be identified as deformed, suggests that labeling crania as typical or atypical for certain groups is incorrect. Further, we suspect that, in many instances, the genetic traits so often described by physical anthropologists (deep palates, flaring zygomatic bones, and round and long heads) may well be the unrecognized result of manual manipulation of the infants' cranial bones. Because research on cranial suture closures suggests that there is wide variability in the ages at which endocranial and ectocranial sutures close after birth, we suspect that classifying any suture closure as modal, abmodal, precocious, or premature is simply worthless.[22-24] If tension is placed on specific sutures, as during head-molding practices and through the application of bands or swaddling cloths or both, it stands to reason that those sutures will respond differently than sutures not subjected to such pressures or manipulations. Consequently, to infer genetic abnormalities, brain growth problems, or premature suture closure solely based on an infant's slightly dysmorphic, or atypical, head shape, without investigating whether the child's head has been intentionally molded, is risky at best.

Except for one man whose mother refused to reshape his head, all of our informants have, themselves, undergone head-molding ministrations. None suffer from any obvious intellectual deficits. One of our interviewees holds a doctor of philosophy degree; 3 are doctoral students; 3 are undergraduate college students; 3 are registered nurses; and others are general contractors, entrepreneurs, homemakers, and service and factory workers. Physical anthropologists and physicians have found little, if any, differences in cranial capacity among grossly artificially deformed and normal crania.[6,11-14] In otherwise normal children, even when sutures close prematurely, there is compensatory skull growth, albeit somewhat dysmorphic on occasion, a response to growth-related increases in brain size.[11,12,14,25,26]

CONCLUSIONS

The limited ethnographic data we have collected thus far indicates that, although we do not see the extreme cranial deformations of the past, infant head molding is still widely practiced. Suspected cases where dysmorphism suggests idiopathic craniosynostosis should be investigated with sensitivity and care, bolstered by the knowledge that the child's family may have been practicing head molding. (Addendum: Since the time this article was accepted for publication, we have collected data on head-shaping practices from an additional 46 women.)

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Reprints: Jack Prost, PhD, Department of Anthropology, The University of Illinois at Chicago, 1007 W Harrison St, BSB 3100 M/C 027, Chicago, IL 60607.

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