1 *The bioarchaeology of children*

1.1 Children in archaeology

This book reviews the current status of children's skeletal remains in biological and forensic anthropology. Child skeletons provide a wealth of information on their physical and social life from their growth and development, diet and age at death, to the social and economic factors that expose them to trauma and disease at different stages of their brief lives. Cultural attitudes dictate where and how infants and children are buried, when they assume their gender identity, whether they are exposed to physical abuse, and at what age they are considered adults. Similarly, children may enter the forensic record as the result of warfare, neglect, abuse, murder, accident or suicide and the presence of young children within a mass grave has powerful legal connotations. The death of a child under suspicious circumstances is highly emotive and often creates intense media coverage and public concern, making the recovery and identification of their remains more pressing. In forensic anthropology, techniques used to provide a biological and personal identification as well as the cause and manner of death provide particular challenges.

The study of children and childhood in social archaeology emerged out of gender theory in the 1990s, and has gradually increased in its sophistication, moving children out of the realm of women's work, to participating and active agents in the past, with their own social identity, material culture and influence on the physical environment around them. Children who were once invisible in the archaeological record are slowly coming into view. The primary data for the archaeology of childhood are the children themselves, and in order to progress this new discipline, it is important to examine how bioarchaeologists derive the data from which social interpretations are made, and the limitations that are inherent in the methods and nature of immature skeletal material, including the impact of the burial environment on their recovery.

Comparative studies of children from archaeological contexts have been complicated by the eclectic use of terminology that both describes the skeleton as a child and prescribes an age for the individual. For example, the use of the term 'infant' properly assigned to those under 1 year of age, has been used to describe children aged up to 5 years, whereas 'juvenile' can be divided into 'juvenile I'

Table 1.1 *Age terminology used in this volume*

Term	Period
Embryo	First 8 weeks of intra-uterine life
Fetus	From 8 weeks of intra-uterine life to birth
Stillbirth	Infant born dead after 28 weeks gestation
Perinatal, perinate	Around birth, from 24 weeks gestation to 7 postnatal days
Neonatal, neonate	Birth to 27 postnatal days
Post-neonatal	28–346 postnatal days (1 year)
Infant	Birth to 1 year
Non-adult	≤17 years
Child	1–14.6 years
Adolescent	14.6–17.0 years
Adult	>17 years

or 'juvenile II' with a variety of ages assigned. One of the most popular terms used by osteologists to describe children is 'sub-adult'. This term is problematic as it has been used to define a specific age category within the childhood period. More fundamentally, sub-adult implies that the study of these remains is somehow less important than that of the adults (i.e. sub = below). Throughout this book children are described as 'non-adults' encompassing all children recovered from the archaeological record up to the age of 17 years. Additional terms divide this overarching category into critical physiological periods of the child's life (Table 1.1). These terms are used for ease of reference and provide a biological basis for discussion; they are not intended to describe the complex social experience of the youngest members of every society, past or present.

This book is divided into nine chapters, covering the development of childhood archaeology and the osteological study of non-adult remains; factors affecting preservation; assessment of their age, sex and ancestry; growth and development; infant and child mortality including infanticide; weaning ages and diseases of dietary deficiency; skeletal pathology; and exposure to trauma from birth injuries, accidents and child abuse. The final chapter considers some future directions for the study of children in bioarchaeology. The following sections explore the gradual development of childhood theory in archaeology and the rise of research into non-adult skeletal remains in both biological and forensic anthropology.

1.2 A history of childhood

Studies of the history of childhood began in 1960 when Philip Ariès published *Centuries of Childhood: A Social History of Family Life*. Ariès argued that

the 'childhood' we know today, which may perhaps be described as a period of 'cosseted dependency' (Derevenski, 2000:4), did not exist until the early modern period. Prior to this, parents were unsympathetic and detached from their children, dressing them and expecting them to behave as miniature adults. Such indifference was considered a coping mechanism to the constant threat of infant mortality (Ariès, 1960). In the past, we were led to believe, a child's upbringing was a combination of neglect and cruelty. Further debates in the 1970s developed the theme (De Mause, 1974; Shorter, 1976; Stone, 1977), while later discourses began to challenge this traditional view (Attreed, 1983; Hanawalt, 1986, 1993; Swanson, 1990; Shahar, 1992). Historians and social archaeologists have now updated and revised our impressions of childhood. In past societies, stages of life that correspond to childhood were recognised and marked by social events or burial practices. Many parents loved their children, sometimes to distraction. For example, Finucane (1997) concentrated on the 'miracle' texts of the medieval period which contained numerous tales of family and village reactions to a child's death or illness, with parents crippled by grief or friends and relatives praying by a riverbank for the recovery of a drowned child. Although important, these studies focussed on the attitude of adults towards children, rather than viewing the past through a child's eyes.

The study of children and childhood in archaeology emerged out of gender theory in the 1990s (Derevenski, 1994, 1997; Moore and Scott, 1997). Previously, children had been considered 'invisible' in the archaeological record, but a feminist reassessment of the past placed specific emphasis on gender and age and with this, on the nature of childhood. Lillehammer (1989) was one of the first to address the role of children in archaeology. She suggested that through the use of burial, artefacts, ethnography and osteology we could gain insight into the relationship the child had both with its physical environment and the adult world. This was followed by an examination of documentary and archaeological evidence for the child in the Anglo-Saxon and medieval periods (Coulon, 1994; Crawford, 1999; Orme, 2001), with Scott (1999) providing a multicultural view on aspects of infancy and infanticide. Crawford (1991) studied the Anglo-Saxon literature for clues as to when children were subject to adult laws. Beausang (2000) expanded this theory of childhood to incorporate the concepts and practice of childbirth in the past, with the recognition of birthing artefacts in the archaeological record. Although a promising start, these studies have been criticised for maintaining the idea that children were passive recipients in their communities, invariably linked to the activities of women (Wilkie, 2000). Furthermore, the category of 'child' is often used in order to investigate the construction of 'adult' (Derevenski, 2000). Neither approach allows us to explore the role of the child as an independent agent in the past. Wilkie (2000) went some way to redress this balance when she used evidence

of the toy industry in the eighteenth and nineteenth centuries to illustrate how, through their own material culture, children displayed their sense of identity and defined their own distinctive social networks and liaisons.

1.2.1 Defining childhood

> BOREDOM !!! SHOOTING!!! SHELLING!!! PEOPLE BEING KILLED!!! DESPAIR!!! HUNGER!!! MISERY!!! FEAR!!! That's my life! The life of an innocent eleven-year-old schoolgirl!! . . . A child without games, without friends, without sun, without birds, without nature, without fruit, without chocolate or sweets . . . In short, a child without a childhood.
>
> Extract from the diary of a child in the Sarajevo conflict, 1992; from Cunningham (1995:1)

As this entry from the diary of a child in war-torn Sarajevo testifies, children have an expectation of what childhood should be. No matter what period we are examining, childhood is more than a biological age, but a series of social and cultural events and experiences that make up a child's life. Childhood can be defined as a period of socialising and education, where children learn about their society, gender roles and labour through play. The initial dependence on their parents for nourishment and protection slowly diminishes as the child ages and becomes an independent member of society. The time at which these transitions take place varies from one culture to another, and has a bearing on the level of interaction children have with their environment, their exposure to disease and trauma, and their contribution to the economic status of their family and society. The Western view of childhood, where children do not commit violence and are asexual, has been challenged by studies of children that show them learning to use weapons or being depicted in sexual poses (Derevenski, 2000; Meskell, 2000). What is clear is that we cannot simply transpose our view of childhood directly onto the past.

Bogin (1997, 1998) takes an evolutionary approach to childhood theory. Childhood is a period in the human life cycle not found in any other mammal, and for Bogin this is defined as a period of time between the ages of 3 and 7 years, when 'the youngster is weaned from nursing but still depends on older people for feeding and protection' (Bogin, 1997:64). The child is constrained by its immature dentition, small digestive system and calorie-demanding brain, which influence the type and amounts of food it can consume. 'Juvenility' occurs with the eruption of the permanent dentition, and when children are able to procure and consume their own foods, as the brain and body growth diminish to less than 50% of total energy needs, and they undergo a cognitive shift. This period begins at the age of 7 and ends with the onset of puberty (*c.*10 years

in girls, *c.*12 years in boys). Bogin (1998) asserts that in humans, childhood performs several functions: an extended period for brain growth, time to acquire technical skills, time for socialisation and an aid to adult reproduction. That is, that the childhood period allows the mother to wean the child and produce other offspring, by passing the energy expenditure of feeding and caring for the child onto siblings and post-reproductive members of society, such as grandparents (Key, 2000). This urge to care for the child is manipulated through the child's retention of its infantile appearance (large cranium, small face and body); that is to say, children are 'cute'. As the body and brain slow in their growth during this period, they require less energy expenditure to feed but are protected during times of hardship (Bogin, 1998). Many would object to this purely biological view of childhood, as it ignores social theories of when a child becomes an 'adult' and a fully fledged member of a society, something that is culturally defined. Hanawalt (2002) argues that in order for a child to survive, it must not only be nursed, fed and kept warm (biological survival), but also be played with and talked to (cultural survival).

1.2.2 Defining the child: biological versus cultural age

One of the resounding issues with the definition of a 'child' in archaeological contexts is the use of physiological age to determine a social category (Gowland, 2001; Baxter, 2005). Physiological age is a biological reality, whereas 'child' is a culturally loaded term. The age at which an individual leaves the world of dependency, learning and play, and takes on roles of work and social responsibility is neither distinct nor universal. That there are three types of age category, 'biological', 'chronological' and 'social', is not denied, but in order to examine the past life-course we need to have consistency in the raw data (the skeletal remains), and use accurate osteological assessments of age and physiological development as a marker from which to base our interpretations of the social understanding of age in the past. Biological age is not irrelevant in the way in which society treats a child. It affects children's connection to their physical and social environment, from total dependency during infancy, to when they begin to crawl, walk, talk and communicate with the adults and children around them (Table 1.2). These abilities are physiologically determined and they dictate how the child interacts. In particular, the misuse of the term 'infant' to refer to children between the ages of 1 and 3 years or 1 and 5 years in studies that use skeletal evidence as their data misses this point. As an infant (under 1 year), the child is particularly vulnerable to disease and death, and its chances of survival significantly increase after the first year. Children who die at around 2 years of age may be reflecting inadequate weaning methods or

Table 1.2 *Child development milestones from birth to 5 years*

Birth to 8 months	8 months to 1.5 years	1.5 to 3 years	5 years
Lifts and holds up head	Begins to crawl and may stand aided by furniture	Stands on one foot or on tiptoe	
Turns over unaided (7 months)	Can throw without losing balance	Can run, skip, climb and has a developed sense of balance	Dresses and undresses
Reaches towards objects	Handles finger-foods Uses spoons and cups	Imitates others	
	Becomes anxious when separated from loved ones	Understands people and objects still exist when they cannot be seen	
Smiling and gazing	Shows affection by kissing and hugging	Expresses pride, pleasure, embarrassment and shame	
	Responds to name	Listens to stories	Tells stories
	Explores environment	Understands the future and the past	
	Interacts with other children		Social interaction and role-playing
Gurgles and babbles to communicate	Forms simple sentences	Uses sentences to communicate feelings and needs	Asks questions about the meaning of words
	Has no understanding of 'male' and 'female'	Understands 'male' and 'female' through dress and over time, but not changing situations	Understands 'male' and 'female' through time and situations: 'gender consistency'

Source: Collated from Berhrman *et al.* (1996) and Kohlberg (1966).

unsanitary conditions, and those that make it to 3 years are talking, playing and actively mobile. By 5 years they are capable of contributing to the household with minor chores. To categorise this most vital developmental period into one age category, 'infant', will mask important physiological and, hence, social advancements.

Derevenski (1997) refers to Kohlberg's (1966) work on a child's understanding of gender roles. Before the age of 2, a child has no concept of male or female but after 2 years of age, they begin to recognise males and females by

visual prompts such as clothing. Between the ages of 3 and 4 years, a child's concept of gender becomes stable, and is understood through time. Hence, if you are male when you are young, the child understands that you will be male as an adult, but if a male begins to perform what the child perceives as female roles, the male would become female. A stage of 'gender consistency' through time and situation is not reached until the child is 5 (Table 1.2). Wiley and Pike (1998) suggested the use of developmental stages rather than chronological age to devise child mortality rates to take into account the activity of the child (crawling, weaning, walking), which is often related to their cause of death through exposure to disease and accidental injury. Although they propose this method for use in modern communities where calendar age is rarely recorded, the application of such developmental age categories into archaeological studies has the advantage of placing the child at the centre of the study by examining the environment from their vantage point.

Although biological age categories provide data from which interpretations are made, adult perceptions of the ability, maturity and responsibilities of children at each age are culturally determined, and must be considered when trying to ask questions about past child activity and health. In the later medieval period, the ages of 8–12 years represented a time when children would begin their apprenticeships (Cunningham, 1995), and children as young as 12 and 14 years could be married in ancient Egypt and Rome respectively, leaving the realm of child for that of wife and mother. Childbirth is not a common interpretation for the cause of death for older children within the burial record. Today in the UK, children reach adulthood by degrees. At 16 they can legally have sex, at 17 they can learn to drive, at 18 they can drink, get married and vote, reflecting their status as full members of society. Crawford (1991) rightly criticises archaeologists for their inconsistency in choosing the cut-off point for children in archaeological reports, which vary from 15 years to 25 years in some cases. These inconsistencies have a great impact on the way in which a cemetery is interpreted. Moving an individual from one age category to another can fundamentally change the profile of a cemetery when attempting to evaluate the pattern of adult and non-adult burials, and to understand the significance of their grave inclusions.

Attempts to define periods of transition in childhood have been carried out by examining the burial of children and the engendered nature of their gravegoods at certain ages. Gowland (2001, 2002) noted that at Romano-British Lankhills in Hampshire, children were buried with gravegoods from the age of 4 and the quantity of artefacts peaked between 8 and 12 years. Gowland (2001) suggests that in these communities at least, age thresholds appear at infancy (where perinates are interred outside of the cemetery area), at 4 years and between 8 and 12 years where the quantity and wealth of gravegoods

increases. Stoodley (2000) examined the presence of certain gravegoods within burials from a large number of Anglo-Saxon graves in England. He noted that 'masculine' spears began to appear more frequently in male graves after the age of 10–14 years, whereas 'female' beads and dress adornments appeared in 'girl's' graves at between 10 and 12 years. This study suffers from a common circular argument which stems from our inability to provide a biological sex for non-adults, and a Westernised view of what is 'masculine' and what is 'feminine'. This circle was partially broken in Rega's (1997) study of burials from Bronze Age Mokrin in Yugoslavia, where children were sexed using canine tooth-crown dimensions. Using these data, Rega revealed that all children were provided with the same feminine engendered artefacts found in adult female graves until around 17 years of age, when individuals sexed as male began to be buried with artefacts associated with the male adult graves. Stoodley's (2000) age bracket in the Anglo-Saxon childhood life-course is supported by Crawford's (1991) analysis of contemporary records revealing that children as young as 10 years could inherit property and be prosecuted under adult laws. Kamp (2001) provides an excellent review of the development of childhood studies and argues that the age categories employed by osteologists are often selected and compared without reference to the society in which the children lived. Biological or physical development and social markers of childhood are not always related. This was demonstrated in Van Gennep's (1960) *The Rites of Passage* in which physical puberty did not always coincide with the rites of passage that marked the adolescents' entry into the adult world. Archaeological evidence from the Anglo-Saxon period also attests to this, with male adult-type gravegoods only appearing once an individual has reached 20–25 years (Stoodley, 2000), some 6 years after they would have reached puberty. While the study of childhood has come some way in elucidating a particular section of the human life-course, Gilchrist (2004) calls attention to the fact that other age categories are still neglected, among them, what it was to be an adolescent in the past.

1.2.3 Children in the archaeological record

Some artefacts have provided tangible links to children in the past. Footprints (Roveland, 2000), death masks (Coulon, 1994), fingerprints on pots (Baart, 1990) and tooth marks in resin (Aveling, 1997) all prove that a child was there. Wilkie's (2000) discussion of toys that were designed, manufactured and sold with children in mind forced historical archaeologists to acknowledge them as actors in past society, but this concept has been slow to catch on in time periods where the material evidence is not so rich. It may be that our association with children and toys is based on Western ideals of what childhood should be, and

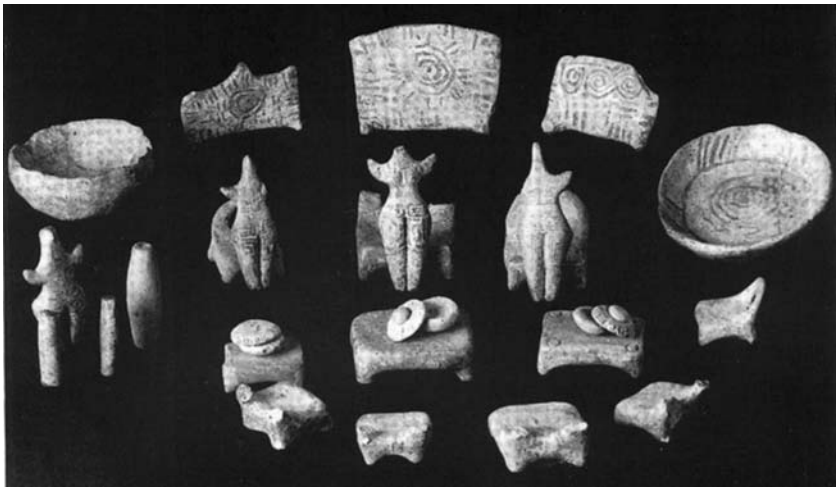

Figure 1.1 Possible toys from the Ovcarovo 'cult scene'. From Whittle (1996:94), reproduced with kind permission from Cambridge University Press.

this has led some scholars to avoid toys as a route to the activities of children (Derevenski, 1994). Nevertheless, humans learn through play, trial and error and it is conceivable that small items or badly drawn or sculpted figures in the archaeological record were used and created by children. Just as female engendered space is now recognised in the past, it is time to start considering the potential of identifying childhood spaces, where 'women and children' are no longer seen as one entity and children are viewed as independent agents within their own social space (Wilkie, 2000). Children have the imagination to make toys out of sticks, stones and everyday household objects that will be invisible in the archaeological record. In this way, children may influence the formation processes of a site, perhaps by the movement of artefacts from their original site of deposition (e.g. a midden), and the physical alteration of household objects. A small pile of stones or an unusual collection of post-holes may indicate a child was at play, and this possibility should be taken into account when interpreting a site. Until recently, child activity in the archaeological record has been seen as detracting from the real issues of adult behaviour (Bonnichsen, 1973; Hammond and Hammond, 1981), rather than being viewed as informative of the child's interaction with its physical environment.

Possible toys have been recovered from various sites throughout Europe. Of particular note are the small decorated clay figures, miniature furniture and tiny bowls found at Ovčarovo, Bulgaria (Fig. 1.1), and the clay house and figurines located in a house at Platia Magoula Zarkou, northern Greece, both finds dating to the Neolithic (Whittle, 1996). Rossi (1993) identified two ivory dolls in the

grave of a Roman child from Yverdon-les-Bains, Switzerland. Such items were traditionally interpreted as 'cult' objects or foundation offerings, rather than as a child's playthings. On the other hand, the idea that all miniaturised items represent toys is overly simplistic. Sillar (1994) noted that in the Andes, while children will play with miniature pots, mimicking adult household practices such as cooking and trade, such pots were also used by adults as donations at shrines. In lithics analysis, small cores have been interpreted as being made by children mimicking the adult knappers. Finlay (1997) suggests that inconsistently made lithic artefacts may be the work of young apprentices, learning the trade and that, as producers, children would make lithics in keeping with the adult norms, rather than on a miniature scale. Bird and Bird (2000:462) argue that differences between adult and child foraging patterns are not always about the learning process, and that 'children are not always practicing to be good adults . . . but are predictably behaving in ways that efficiently solve immediate fitness trade-offs'. If this pattern is predictable then we should be able to identify it in the archaeological record. In particular, Bird and Bird (2000) examined the different adult and child patterns of shellfishing in the Eastern Torres Strait on the Great Barrier Reef. Due to their inexperience, children tended to collect a wider variety of less valuable shellfish, which they proceeded to eat, leaving them in small middens outside the settlement. Adults were able to exclusively collect the most profitable and difficult-to-gather shellfish, avoiding the types the children collected. In the archaeological record, two forms of shell midden in different locations should be evident, with the more diverse and marginal middens representing the foraging patterns of the children.

1.3 Children in biological anthropology

The study of children in biological anthropology has earlier beginnings than in social archaeology, but they were no less focussed. Most studies were stimulated by an interest in fertility levels, or the information that child survival could provide on adult adaptation to their changing surroundings. These endeavours were constantly being frustrated by the perceived notion that infant and child remains could not survive the burial environment. It was only in the 1990s that the study of non-adult skeletons began to concentrate on the information that could be provided on the growth and health of the children themselves, providing information on their activities and risk of infection or injury in contrasting environments. Examination of the physical remains of children provides us with the most direct and intimate evidence for them in the past. This section outlines the development of the study of child skeletal remains in biological anthropology and palaeopathology up until the present day.