THE PEOPLE OF THE HIND SITE

Tamara L. Varney and Susan Pfeiffer

Non-cremated skeletal remains from the Hind Site (AdHk-1), a Late/Transitional Archaic burial site located in southwestern Ontario, were studied with an emphasis on health status. Twenty-two individuals are present, including sixteen adults and six subadults. This study complements previous research by Pfeiffer (1977), and includes nine individuals documented for the first time. The age-at-death ranges from three months to over 50 years, and the mean life expectancy of this sample is low. The general health of these people is characterized by pervasive osteoarthritis and poor dental health, although there is little evidence of infectious disease or nutritional deficiency. Two unusual cases of pathology are presented: a tumour-like lesion in a middle-aged adult female, and a young adolescent with a chronic metabolic disorder. The condition of the latter may have obliged the group to invest much time to caregiving.

INTRODUCTION

A detailed archaeological analysis of the Glacial Kame burials at the Hind Site (AdHk-1) is given elsewhere (Donaldson and Wortner, this issue *supra).* The following osteological analysis complements a previous study by Pfeiffer (1977), and includes an additional nine individuals from Burials 2, 5, 6, 12 and 13 which were not previously studied.

MATERIALS AND METHOD

Sex and age were determined for adults on the basis of cranial and pelvic morphology. Adult age was determined by applying as many methods as possible and choosing the estimate that yielded the highest degree of consistency. The techniques include examination of the pubic symphysis (Brooks and Suchey 1990; Gilbert and McKern 1973), auricular surface (Lovejoy et al. 1985), sternal rib end (Iscan et al. 1984, Iscan and Loth 1985), and ectocranial suture closure (Meindl and Lovejoy 1985). The age estimates for immature individuals were determined using dental development (Moorrees et al. 1963), dental eruption (Ubelaker 1989:64), long bone diaphysis length (Hoffman 1979, Merchant and Ubelaker 1977) and epiphyseal union (Sledzik and Willcox 1993). Because the majority of the remains were in excellent condition, all or most of these techniques could be applied. The completeness of the fragmentary remains was a factor in the analysis and limitations are noted where encountered. In instances where materials studied by Pfeiffer (1977) are re-analyzed here, some adjustments have been made to age at death estimates since new assessment methods have been developed in the interim.

The external surfaces of all bony elements of the skeletons were examined for any evidence of pathological changes. Radiographs were taken of subadult tibia and radii, as well as most pathological elements. Radiographs of the right tibiae and radii of all the immature individuals were taken in the antero-posterior view, and examined for the presence of Harris lines. These lines can be visualized radiographically as transverse lines of increased opacity. According to Mays (1985), the radiopacity must extend at least halfway across the transverse diameter of the bone. The distance of each Harris line from the closest end of the bone was measured.

RESULTS

The following suggests some basic life characteristics of the individuals found in each burial, as can be deduced from the bones and teeth. Since only the primary inhumations of the Hind site are considered, the numerical sequence of the burials is interrupted whenever the cremated inhumations are excluded.

Burial 1

This burial consists of the partial remains of an adult female 20 to 25 years of age (pubic symphysis 22-29 years, auricular surface 20-24 years, iliac crest and medial clavicle epiphysis < 23 years). A lumbar vertebra shows bilateral spondylolysis. This condition may have resulted from a fatigue fracture due to repetitive stress and likely manifested mild symptoms. Spondylolysis may have predisposing factors of a familial nature (Merbs 1989).

Burial 2

This burial is a complete skeleton of a juvenile individual showing a range of abnormalities. The dental eruption status of both jaws indicates an age of 12 years. The permanent second molars, premolars and canines have erupted, and radiographic analysis illustrates their root closure. The mandibular third molars are present in their crypts with roots approximately 1 /4 developed. An age of about 14 years is suggested, based on the degree of third molar root development. In contrast, the diaphyseal lengths of the long bones suggest a much younger age of 6 to 8 years. Furthermore, the states of epiphyseal union through the body are inconsistent. Union was in progress at the distal first metacarpals and superior dens of the second cervical vertebra. These events usually commence at approximately 12 to 13 years. On the other hand, the ischiopubic ramus and the acetabulum of the hip bone, as well as the scapula and the long-bones, exhibit none of the signs of fusion which should be evident by 12 to 13 years. These epiphyseal sites suggest an age younger than 10 years.

Estimation of age using dental eruption is normally given more weight than long bone growth because dental eruption is not as readily affected by adverse environmental factors (Saunders and Spence 1986). Overall, the remains of this individual indicate an age of approximately 12 to 13 years. When compared with the other juveniles from this site, however, the long bones are short and underdeveloped (Figure 2). All of the bones lack the expected surface development at sites of muscle attachment such as the radial tuberosity and Linea aspera. No gross anatomical malformation or asymmetry is exhibited. The bones simply appear extremely slight and gracile compared to other individuals and lack the expected definition.

Areas adjacent to the metaphyseal-epiphyseal junctions on the long bones, and on the posterior mandibular condyles, are highly vascularized and exhibit a honeycombed appearance in excess of the expected degree of vascularization. This excessive vascularity may represent deficiency in bone tissue production induced by growth disturbances (Gregg and Gregg 1987:102-103). Retarded growth due to metabolic disturbance is further suggested by the inconsistent pattern of epiphyseal closure. Radiographs of the tibia and radius reveal thin cortices and Harris lines. Several factors could have been responsible for the thin cortex and lack of distinctive muscle markings on the bones, including poor nutrition due to reduced appetite and malabsorption, and inactivity.

This individual also exhibits (a) moderate cribra orbitalia, which is indicative of anemia resulting from non-specific chronic illness and/or malnutrition (Ortner and Putschar 1981:258-260), (b) lipping that resembles "slip" wearing on the anterior border of the mandibular fossae, although there are no corresponding lesions on the mandibular condyles, and (c) a compressed anterior margin on one of the upper three lumbar vertebral bodies.

The dentition also points to the child's poor health. Many of the permanent teeth were lost antemortem (maxillary right second premolar, both lateral incisors and left premolars; mandibular right first molar, premolars, both central incisors, left premolars, and first molar). Radiographs of both the jaws reveal no signs of unerupted teeth or root tips below the alveolus. These observations make failure to erupt or trauma improbable as explanations for the missing teeth. Also, if the missing teeth were absent congenitally, the remaining teeth would reflect this in their alignment (Figure 1).

Extensive wasting of the alveolar bone is evident, particularly on the mandible. There is very little wear on the second molars and considerable calculus deposited on the anterior and right posterior dentition. The left posterior dentition has only a slight accumulation of calculus. These accumulations suggest ingestion of soft, prepared foodstuffs such as gruel.

The cause(s) of the pathological conditions which afflicted this child are not known, but the

skeletal evidence is suggestive of a chronic metabolic disturbance. The child's health was poor, compromising his/her quality of life and activity level, and likely requiring other members of the group to invest much time in caregiving.

Burial 3

This burial is the complete skeleton of an adult female in her mid-thirties to early forties (pubic symphysis 22-40 years, auricular surface 40-44 years, fourth sternal rib end 33.7-46.3 years, ectocranial sutures 22-48 years). The maxillary teeth are severely worn. All of the maxillary molars and right premolars are missing premortem, and the mandible is edentulous. Ossified thyroid cartilage and a completely fused hyoid bone are present. Arthritic changes are present on the proximal ulnae and humeri, right distal ulna, proximal tibiae, clavicles, and all regions of the spine.

Burial 5

In addition to a primary inhumation, this feature yielded fragments of at least two other individuals from the overlying plow zone.

The primary inhumation contained the incomplete and very fragmentary remains of an adult female. Only the occipital and temporal bones of the skull are relatively intact. The assigned sex is based on cranial (small mastoids and overall size) and pelvic fragments (presence of a wide sciatic notch, raised auricular surface and deep preauricular sulcus), as well as the small body size when compared to other, more complete individuals at the site. All bones are adult in appearance. The auricular surface is the only clue available for a more precise age estimate and indicates an age range of 40 to 45 years. The partial dentition is worn through the cementoenamel junction. Fragments from the lower vertebral column (lumbar and sacral regions) display degenerative arthritic changes including rarefaction and osteophytic lipping of the body surfaces and apophyseal joint facets. Such changes, with the addition of subchondral destruction, also exist on the acetabulum, tibia, femur, patellae, fifth metatarsal and mandibular fossae. Five arnorphoric lumps, which vary in texture, width and size are also present, and appear to be calcified soft tissue. Due to the disturbed nature of this feature, it was not possible to ascertain the original anatomical location of these fragments.

In the plow zone above Burial 5, additional fragmentary remains were recovered which do not appear to be associated with any of the burials on the site. All elements are adult in appearance, and while no skeletal elements of the skeleton are duplicated, it is apparent that at least two individuals are represented. Several cranial vault fragments, including fragments of occipital, superior frontal and parietals, display closure of only the endocranial sutures. A virtually complete mandibular dentition (left second premolar and molars missing) exhibits severe attrition, as well as alveolar resorption and defects on the socket margins indicative of periodontal inflammation. A fragmentary left temporal bone and ear ossicles were also recovered. Incomplete infracranial remains include a fragment of a left humerus head, a left proximal ulna and radius, fragments of two scapulae, distal fragments of three metacarpals, a left fifth metacarpal, fragments of iliac crest and a pubic ramus, a partial pubic symphysis, small fragments of sacrum and vertebrae, rib fragments including two sternal ends, a fragment of a distal femoral condyle, a right talus, a left second and third cuneiform, and left first and fifth metatarsals.

The majority of the remains, with the exception of the ribs and pubic symphysis, likely represent a single individual. Based on the overall characteristics of remains at this site, these fragments probably belong to a male of at least 40 years. This assessment is based on the large size and rugosity of the elements, plus the fact that the majority exhibit similar arthritic degeneration, including lipping, porosity and subchondral destruction. The cranial fragments are of the same texture and colour as these remains, and the dental attrition on the mandibular teeth is appropriate for an individual of this age.

The pubic symphysis and rib fragments do not appear to match this individual. The partial pubic symphysis has a deeply billowed morphology suggesting a young adult age, probably under 25 years old. Two sternal rib ends also point to a young age at death (phase 0-1, age range 17-18). The **sex** of this second individual is not determined.

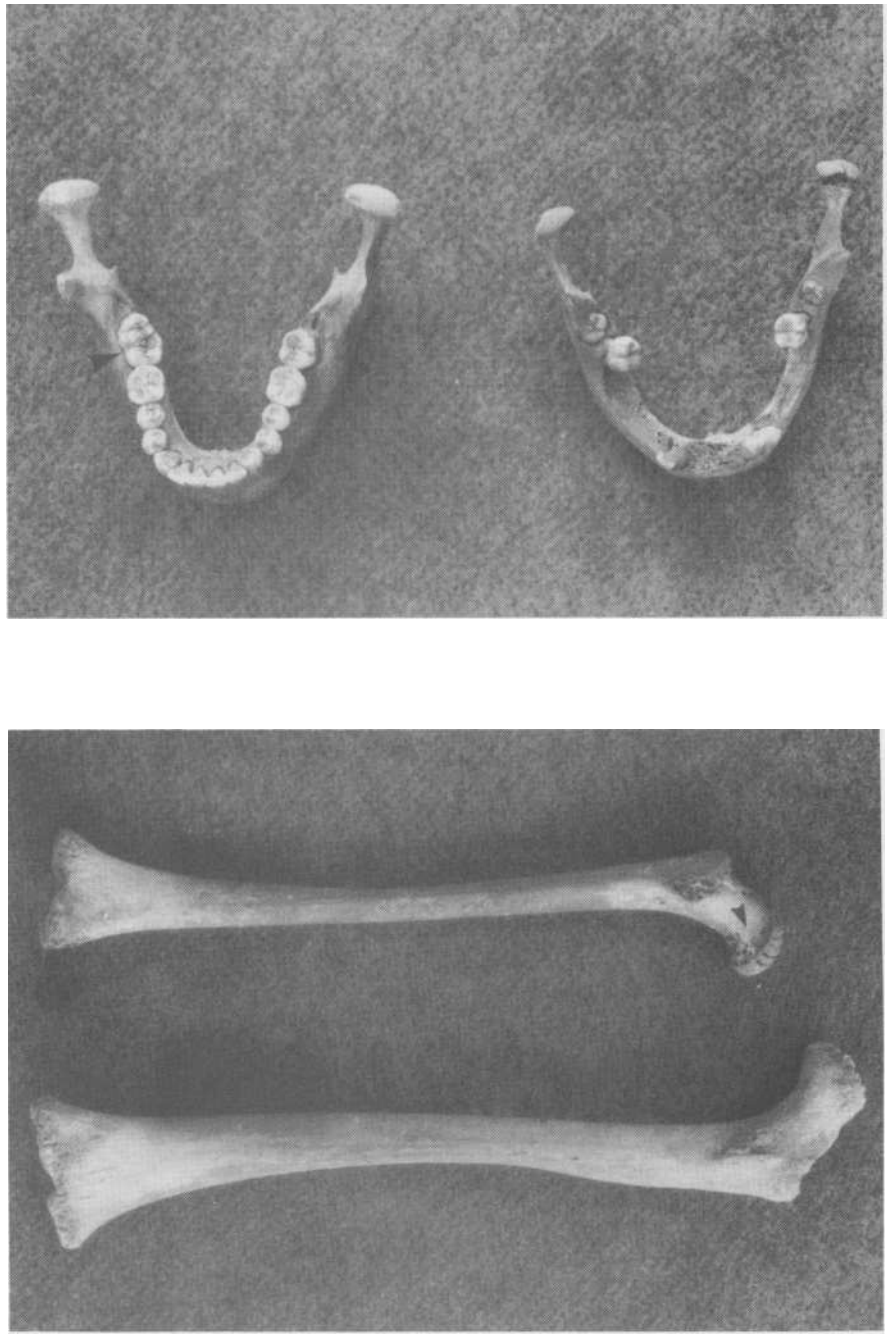

Figure 1. (Top) Mandibles from Burial 2 (right) and Burial 15 (left). Both were approximately the same age when they died. Note extensive premortem tooth loss, reduced corpus height and small mandibular condyles on Burial 2 mandible. Burial 15 mandible has a congenitally fused M2 - M3 (arrow)
Figure 2. (Bottom) Femoral shafts from Burial 2 (top) and Burial 15 (bottom). Note smaller size, less muscular development and greater porosity near some growth plates (arrow) on Burial 2.

Burial 6

This is the incomplete and fragmentary skeleton of an adult female, 32 to 39 years old (pubic symphysis 23-39 years, auricular surface 30-34 years). A partial dentition was recovered in the plow zone above this burial. All the teeth have been worn so that only the roots remain.

Signs of degenerative arthritis appear at most appendicular joints and throughout the spine. In addition to rarefaction and slight lipping, subchondral destruction is common on most of the articular surfaces. Although the cervical and lumbar regions of the spine exhibit pronounced changes, the thoracic region is normal with the exception of four apophyseal joints with lipping. The right articular facets between the atlas and axis exhibit significant degeneration and changes including osteophytic lipping, severe eburnation and deformation of the right side of the dens. The third through fifth cervical vertebrae are marked by apophyseal joint lipping and extreme osteophyte. formation on the body margins. The bodies of the fourth and fifth cervical vertebrae display anterior compression fractures. The remaining two cervical vertebrae bodies show severe rarefaction of their surfaces.

Only four lumbar vertebrae are present. The three inferior vertebrae exhibit large osteophytic growths on the body margins and one has a large, oblong Schmorl's node. A Schmorl's node represents herniation of the invertebral disc into the vertebral body (Ortner and Putschar 1981:430-432).

A premortem condition has created a large hole through the ilium of the left hip bone. The external borders of the hip bone (i.e. iliac crest) remain intact and apparently unaffected. The lesion extends almost the entire height of the ilium. The lesion extends internally to the auricular surface where it involves the preauricular sulcus, but the sacroiliac joint surface itself is minimally involved. The lesion perforates both the lateral and medial walls of the ilium. The cortical margins on the lateral side appear to have suffered slight postmortem damage, but are generally well defined. The periosteal surface adjacent to the lesion exhibits only a small amount of disorganized bone apposition. Linear struts and large pores line at least half of the lesion's medial circumference, giving it a honeycomb appearance. There are no exostoses, and only slight expansion from the expected shape of the bone. Large, thick trabeculae line the internal boundary of the lesion and are mainly oriented with the long axis of the bone. No spongy bone is present, and it is clear that the resorption of the spongy bone occurred premortem. Radiography reveals a multilocular region surrounded by a sclerotic margin. The extent of heavy trabecular support and sclerotic build-up are evidence of the chronic existence and slow growth of the lesion. No similar lesions were observed on any other bony elements (Figure 3).

The bone and radiograph of the bone were independently examined by two radiologists, the late Dr. W.P. Cockshott and Dr. P. White at McMaster University Hospital. The condition was tentatively diagnosed as an enchondroma, a benign bone tumour composed of cartilage. This condition is often considered to be a growth dysplasia due to a failure of normal endochondral ossification. These tumours often begin in utero and grow until the afflicted individual reaches maturity. They are most often asymptomatic and do not usually require treatment. In some cases chondrosarcoma, a malignant condition, may develop in later adult life (W. Cockshott, personal communication 1993; Dahlin 1978:28-42, Steinbock 1976:325). The multilobular radiographic appearance, sclerotic margins, and noninvolvement of the joint are typical of an enchondroma. This lesion is, however, unusually large for an enchondroma. Other possibilities (in order of preference) include metastatic cancer, fungal infection or a hydatid echinococcosis.

Burial 9

This is the complete skeleton of an adult female approximately 30 years of age (pubic symphysis 23-39 years, auricular surface 30-34 years). The individual has osteophytes on the seventh and eighth thoracic, and the fifth lumbar vertebrae. Arthritic lesions were not present on any other joint surfaces. The teeth are only slightly worn.

Burial 10

This is the complete skeleton of an adult male estimated to be between 45 and 60 years

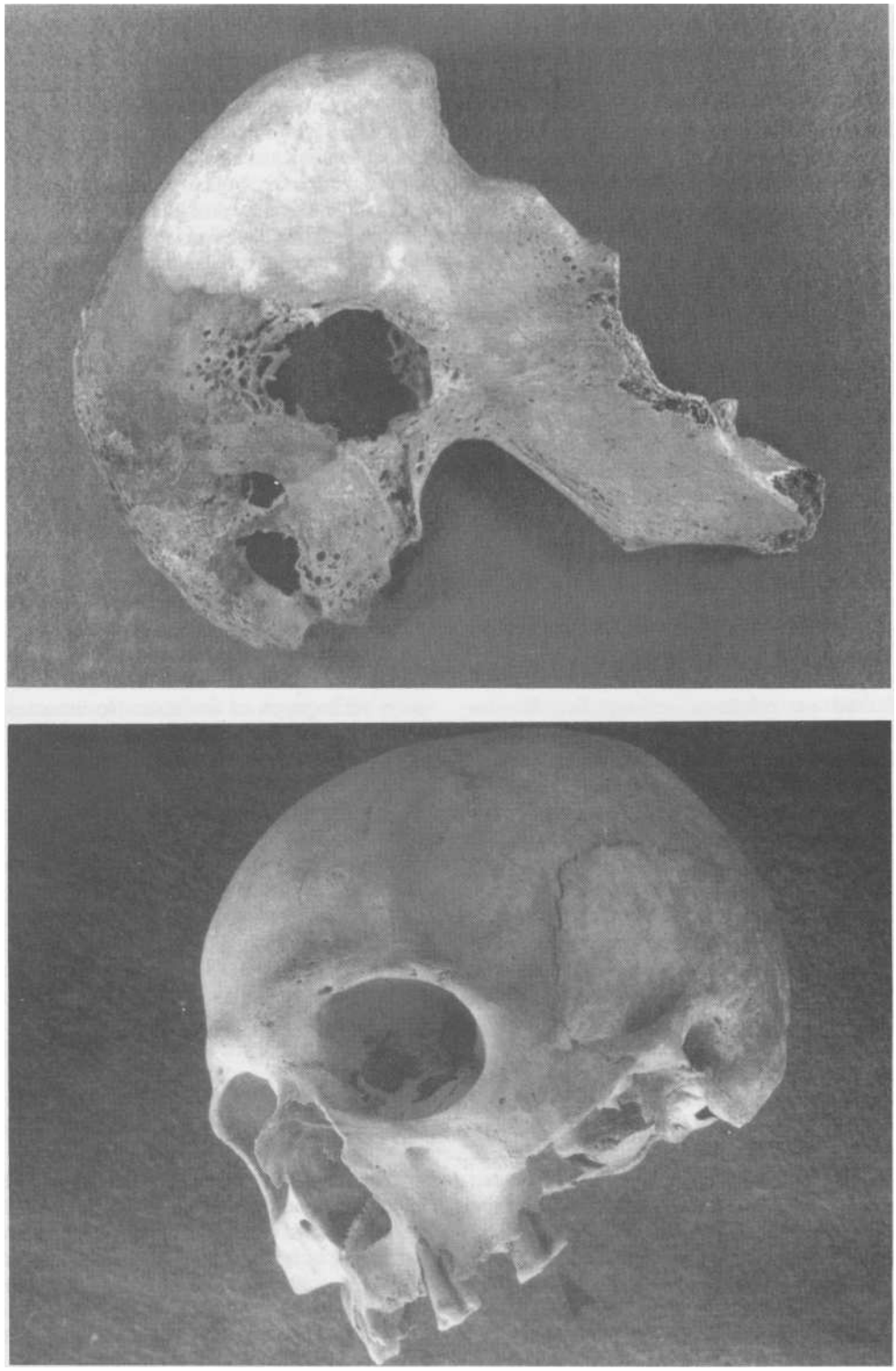

Figure 3. (Top) Medial view of left hip bone from Burial 6 showing extensive lesion probably due to a tumour.
Figure 4. (Bottom) The skull of Burial 10. Arrow points to interproximal caries, unusual in association with marked attrition.

of age (pubic symphysis 28-78 years, auricular surface 45-49 years, sternal rib end 43.3-58.1 years and 59.2-71.2 years, ectocranial sutures 30-71 years). The degree of dental attrition is extreme, with the majority of teeth having only the root tips remaining. Three of these tips were held in place by soft tissue alone, the bony sockets having been completely resorbed. Dental caries on the maxillary dentition include one on the distobuccal side of the crown of the left canine, one on the mesial cementoenamel junction of the right second molar, and two interproximal affecting the distal side of the right second molar and mesial side of the right third molar (Figure 4). Ossified hyoid, thyroid and costal cartilage are present. All regions of the spine exhibit arthritic changes, as do the majority of the articular surfaces on the skeleton. The sides of the neural arch of the first sacral vertebra are unfused, a condition common to the lower spine which has little or no clinical significance (Hadley 1964:35).

Burial 12

Based on minimum counts, this feature contained the very fragmentary remains of at least three adults. None of the elements are appropriate for precise age estimation and no good indicators of sex are present. The degree of robustness of three occipital bone fragments representing three different individuals suggests one male, one female, and one unknown. Other cranial elements include fragments of a mental trigonum, left coronoid process, two mandibular fossae (one from each side), and two right temporals.

Fragments of the permanent dentitions of two individuals include three maxillary third molars and one mandibular left second molar. The teeth are moderately worn and exhibit three caries, including one on the upper right third molar at the cementoenamel junction, and two others on the crown of the lower left second molar (one on the mid-occlusal surface and one on the mid-lingual side).

Infracranial elements include fragments of the acromial ends of three clavicles, a few rib and vertebra fragments, the distal half of a left humerus, a humeral head fragment, ulnae and radii fragments from both sides, four fragmentary proximal femur shafts (three left, one right), five femoral heads, left and right tibia shaft fragments, three tali (one left, two right), fragments of 13 phalanges and many very small long bone fragments. The only apparent pathological condition affecting the bone consists of a femur shaft fragment (1/4 of the proximal shaft just distal to the lesser trochanter) that has its entire surface covered by periostitis. We interpret this as a non-specific response to health stress.

Burial 13

This is the complete skeleton of an infant approximately 12 months old (diaphyseal lengths 12 months, dental age 11-12 months). No Harris lines are visible on a radiograph of the tibia. No unusual or pathological conditions were observed.

Burial 14

This is the complete skeleton of an adolescent with an estimated (epiphyseal union) age range of 15 to 18 years. Based on the morphology of the cranium and pelvis, this individual was probably female. Harris lines are visible on a radiograph of the tibia. No unusual or pathological conditions were observed.

Burial 15

Based on the epiphyseal union, this is the complete skeleton of a 13-year-old adolescent. The second and third molars are fused together to form one element and are erupted. Radiographs of the tibia and radius exhibit very distinct Harris lines. Fragments that appear to represent calcified soft tissue were recovered from the abdominal region of the skeleton during excavation of this burial (Figures 1 and 2).

Burial 16

This is the complete remains of a young infant approximately 3 to 4 months old. Dental formation and eruption charts provide age estimates of birth to 2 months and 6 months (Ubelaker 1989:64), and 3 to 4 months (Moorrees et al. 1963). The long bone diaphysis lengths indicate an age less than 6 months. No Harris lines are visible on a radiograph of the tibia.

Burial 18A

Based on the epiphyseal union, this is the skeleton of a late adolescent, approximately 15 to 18 years old. The cranial and pelvic morphology suggest a female, but the sacrum is quite curved. Hence, this person may be too young for a confident assessment of sex. The individual has peg-like third molars. No Harris lines were observed on radiographs of the tibia and radius.

Burial 19

This is the skeleton of an adult male in his late thirties to mid-forties (pubic symphysis 23-59 years, auricular surface 40-44 years, sternal rib end 34-42.3 years, ectocranial sutures 24-75 years).

The proximal head of the right radius has a porous, triangular-shaped depression in its centre. This lesion is probably the remnant of a healed green stick fracture sustained in youth (Pfeiffer 1977:40). Arthritic changes including osteophytic lipping of articular surfaces are present on the bones of the lower left leg and foot, as well as on much of the spine. This individual exhibits ossification of the thyroid and costal cartilages, the ligament of seventh thoracic vertebra, and several other amorphic pieces.

Two periapical abscesses are present, one at the left mandibular canine and first premolar and one (which appears to have been healing) at the first maxillary molar (Figure 5).

Burial 20

This is the complete skeleton of an adult male, approximately 35 years old. An age range of 30 to 40 years (pubic symphysis 22-43 years, auricular surface 40-44 years, ectocranial sutures 24-60 years) is estimated.

Alveolar resorption has left the posterior teeth with very little bony anchorage. There are three periapical abscesses located at the lower left canine, the upper left second premolar and the upper left second molar.

Arthritic changes to the skeleton are evident on the wrist and hand bones, distal femora, patellae, both first metatarsals and proximal phalanges, and the spine. The first thoracic vertebra exhibits an ossified tendon.

Burial 21

This is the partial skeleton of a young adult female, possibly mid-twenties to mid-thirties in age. This age estimate is derived from the dentition and ectocranial suture closure — the only elements available for age estimation. The degree of dental attrition is severe, with all the teeth worn into the pulp cavities. The upper right first premolar has a periapical abscess. All of the teeth have significant calculus build-up. The roots are thickened with a layer of secondary cementum. This is indicative of chronic minor trauma to the teeth, such as biting hard foodstuffs or using teeth as tools (J. Mayhall, personal communication 1993).

The vertebral column is fragmentary. The cervical region exhibits degenerative changes including rarefaction, lipping and compression of the centra.

Burial 22

This is the complete skeleton of an adult male 25 to 30 years old (pubic symphysis 19-35 years, auricular surface 30-34 years, ectocranial sutures 19-48 years). The last element of the sacrum is not united with the main body, indicating an age under 30 to 32 years. All of the teeth are worn through the enamel and exhibit secondary dentin on the occlusal surfaces. The proximal femur is broken into several pieces. The broken ends show no signs of healing and are covered by the same red stain as the outer surface of the bone. This suggests that the femur was broken during the collapse of the grave shaft soon after burial while the bone was still relatively green or that a compound fracture was associated with the cause of death.

Burial 23

This is the complete skeleton of an adult male 45 to 55 years old (pubic symphysis 23-59 years, auricular surface 40-44 years, ectocranial sutures 33-76 years). The dentition has been severely worn. The anterior teeth are represented only by root tips, and the posterior teeth have only small portions of crown remaining. Very little anchorage of the roots by alveolar bone suggests they were held in place mainly by soft tissue. The left maxillary dentition includes two small nodules of isolated

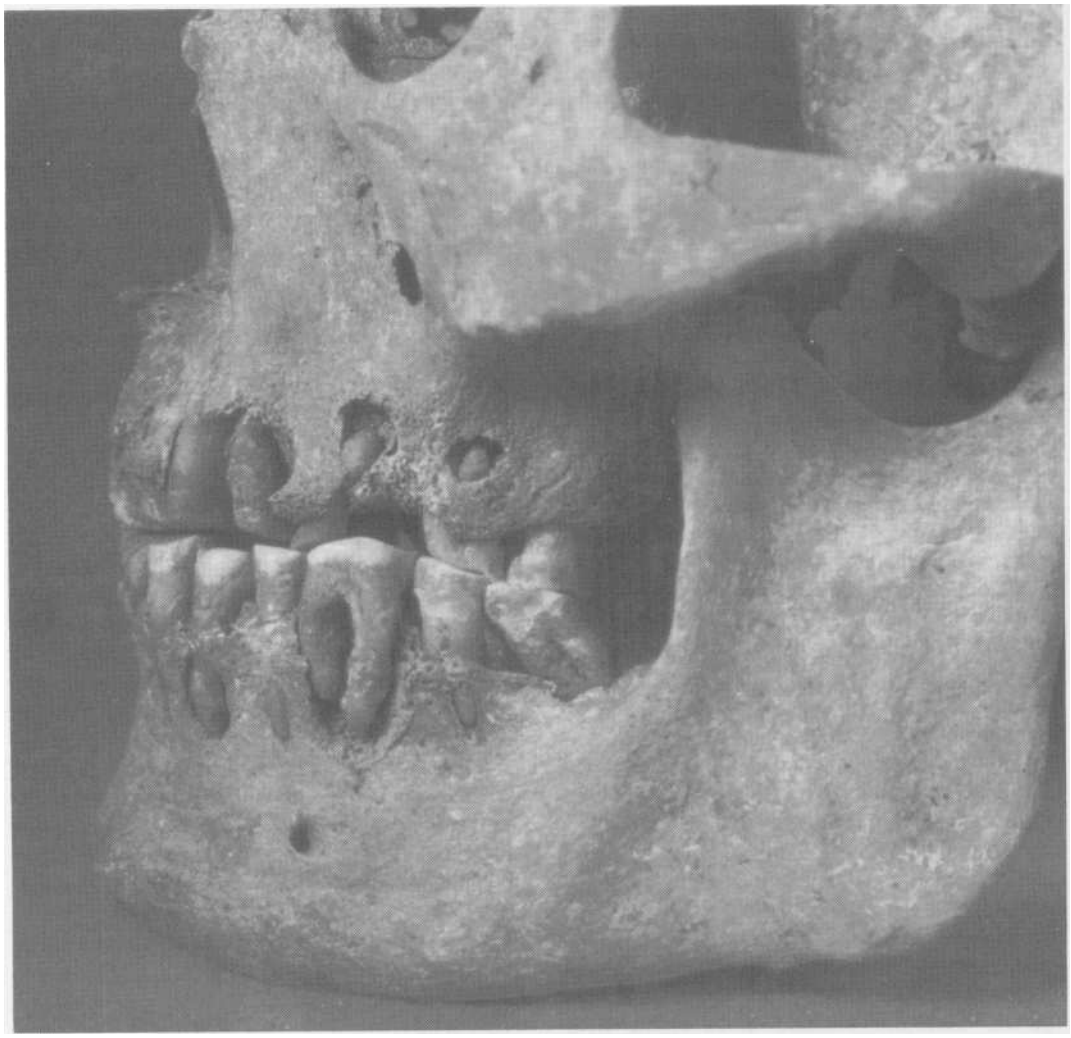

Figure 5. Left lateral view of skull from Burial 19 showing extreme dental wear and abscessing.

dentin rooted in the alveolar bone. They are located on either side of the first premolar on the buccal side, and are not long enough to contribute to the occlussal surface. Rose et al. (1984:47, 53) report a case with similar nodules at almost the same location. A smooth, circular passage leads into the sinus cavity at the site of the right maxillary first and second molar sockets. The tooth sockets are completely obliterated. The right zygomatic process has a depression just below the orbit and lateral to the nasal aperture. The floor of the depression is porous, but shows little evidence of new disorganized bone apposition. These features represent a dental abscess that has spread to the maxillary sinus and soft tissue.

The muscle markings of the infracranial elements are very robust. All regions of the spine show degenerative arthritic changes on all articular surfaces. Such changes are also evident on most of the other infracranial elements, with the addition of small areas of subchondral destruction on the distal femora, tibiae and patellae.

SUMMARY

Sample Composition

Twenty-two individuals are represented by the noncremated skeletal remains excavated at the Hind site. These include 16 adults of which seven are female, seven are male and two are of indeterminate sex. There are six immature individuals including two adolescents, two juveniles, and two infants. Overall, this sample spans a broad age range, from three months to late middle age. Among the adults, the average age of death is 35 years and is slightly lower for females (32 years) than for males (39 years). At least one of the males (Burial 10) may have survived to the age of 60.

The mean life expectancy in this sample is low. If this is a random sample that reflects the mortality pattern of a band of hunter-gathers, it suggests that about one third of the children did not survive to reproductive age. Further, it suggests a relatively high probability of dying during mid-childhood and adolescence — times which are not normally considered periods of risk. Conclusions about palaeodemography can be misleading when they are based on such small samples. Nevertheless, the mortality profile is consistent with people who died not from disease but from mishaps and, perhaps, occasional food shortages. Such factors could affect people at any age. As explained below, the adults' dental problems may have made some of them more vulnerable. Their general health is characterized by pervasive degenerative arthritis and poor dental health but little chronic infectious disease or nutritional deficiency. While some of the subadult individuals exhibit multiple Harris lines and Burial 2 shows moderate cribria orbitalia in concert with other abnormal features, no other indicators of chronic nutritional stress (e.g., enamel hypoplasias and porotic hyperostosis) are apparent on the skeletal elements. The size and robustness of the adults attest to the general adequacy of their nutrition.

Skeletal Health

All adults show evidence of pervasive osteoarthritis, ranging from a mild to moderate degree. Rarefaction and lipping of the joint articular surfaces characterize the arthritic changes. Although commonly associated with advanced age, this degenerative disease of articular cartilage and bone can be caused by trauma, such as activity-related stress which produces repetitive damage to the joint. Overall, the lesions seen in this sample occur throughout the skeleton, with the spine affected most severely. In addition to osteoarthritic lesions on the apophyseal joints of the spine, osteophytic lipping of the body margins is common. These bony outgrowths of bone indicate degeneration of the intervertebral disc consistent with activity-related stress. They are a compensatory reaction that provides additional support and stability to the spine (Hadley 1964:230-238).

The arthritis suffered by the Hind Site adults is almost certainly the result of a pervasively rugged lifestyle, reflecting the accumulation of injuries sustained by repetitive microtraumatic events related to commonly undertaken activities. The symptoms manifest by such a condition (i.e., pain and limitation of movement) vary considerably between individuals in a clinical context and range from none to severe (Hadley 1964:265).

With the exception of dental abscesses, bony evidence of infectious disease is scarce, with the only other manifestation being perios-

titis on a femur shaft fragment from Burial 12. Burial 12 is a mixed feature that also includes two carious teeth (possibly from another individual), which are also rare in this group. Archaeological evidence (Donaldson and Wortner, this issue *supra),* suggests that this burial may be an intrusive feature from a later time period.

It is interesting that several of the adults exhibit ossified thyroid cartilage — probably a familial trait when it occurs in such young adults. Also recovered were several fragments from Burials 5 and 15 that appear to be calcified soft tissues. These pieces deserve further study.

The presence of Harris lines may be a general indicator of stress during an individual's period of growth and development. Harris lines may represent periods of growth arrest due to acute stress such as illness or malnutrition, followed by sufficient recovery to allow catch-up bone growth (Mays 1985). Harris lines could be seen on the radiographs of three of six juveniles. Two of the individuals who did not exhibit Harris lines were under one year. Since this feature is rarely seen in infants under one year of age, it was not expected that these infants would exhibit Harris lines. A short lifespan probably would not have allowed for sufficient time for the cycle of health stress and recovery required for line formation (Pfeiffer et al. 1986:30). The presence of Harris lines in the three subadults may indicate that these children were affected by periodic bouts of stress severe enough to induce growth arrest, perhaps on a seasonal basis and due to fluctuations in food supply.

Dental Health

The Hind Site dentitions show extreme attrition, periodontal inflammation, periapical abscessing and premortem loss. Caries are almost nonexistent, found only in Burial 10 and Burial 12 (possibly an intrusive feature). Severe attrition and/or chronic trauma to the dentition, resulting from such activities as chewing or biting hard substances and use of teeth as tools, can cause periapical abscessing. No differences in tooth wear were noted with respect to tooth type or sex, and the pattern of molar occlusal wear is characteristically helicoidal. These features suggest that coarse dietary foodstuffs were primarily responsible for the attrition.

Severe attrition of a tooth may expose its pulp cavity to invasion by microorganisms, leading to infection that spreads toward the apical region. In the chronic form, periapical periodontitis appears in sinuses at the root apices. These sinuses form to accommodate the pus and granulation capsule that surround the infection (Hillson 1986:316-317), and are apparent in the alveolar bone of several of these individuals (Burials 19, 20, 21 and 23). The presence of disorganized cementum deposited on the root surface is also evidence of chronic trauma and infection (Brothwell 1963:282-283. J. Mayhall, personal communication 1993).

Substantial alveolar resorption occurs as a direct result of chronic inflammation and tooth loss. Some individuals retain teeth that are no more than short remnants of roots with very little or no bony anchorage. Meticulous excavation of the site led to the recovery of even the smallest fragments of tooth roots. The poor anchorage of the teeth may also be partially due to slow continuous eruption, an adaptive response which maintains the occlusal surface as the crown is worn (Hillson 1986:180-183).

There is no doubt that the poor dental health described above would have had an impact on the quality of life and general health of the Hind Site people. By the early to mid-part of their fourth decade of life, many adults had very little enamel crown remaining on the majority of their teeth, in some cases retaining only small remnants of the roots, and had experienced premortem tooth loss. These conditions coincided with the average age at death for this group. Poor dental health can compromise general health through poor nutrition due to loss of appetite, reduction of masticatory efficiency and the spread of infection (Powell 1985).

CONCLUSIONS

The people interred at the Hind Site provide us with some insight into life in the Late Archaic period of Ontario. The common chronic health problems shown are activity-induced osteoarthritis and poor dental health due to heavy wear. As expected in any group with a hunter-gather subsistence involving wild, coarse foodstuffs, caries are rare. With the exception of dental abscesses, bony evidence

of chronic infection or malnutrition is also scarce. There are few examples of major pathological conditions represented, and causes of death are not evident.

Two exceptional cases of pathology are present. Neither points to a clear etiology and both merit further study. The woman of Burial 6 exhibits a longstanding lesion of the left ilium, possibly representing a tumour or tumour-like condition, which apparently did not affect her hip joint or her gait. Given the size of this lesion it is unlikely that it remained asymptomatic.

The remains in Burial 2 are of a chronically-ill young adolescent. The other members of the group probably invested a great deal of time to the care of this child. The weak development apparent in the bones of this child indicates that he/she was limited in the amount of activity he/she could perform, and would have required mobility assistance. The fragile state of the child's dentition and jaws also suggests that the child's food was ground into a gruel that would not require much mastication. Despite having a condition that precluded a normal share of the labour, the child was not abandoned. The long term care of this child suggests a culture that placed value on the well-being of its less-fortunate members. De-spite the challenges faced by this group, their cultural system appears to have provided for the food and transportation of the child. Further study of both these cases is in progress.

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Tamara L. Varney, Anthropological Survey, New York State Museum,
Room 3122 CEC, Albany, New York, 12230.
Susan Pfeiffer, School of Human Biology, University of Guelph, Guelph, Ontario, N 1 G 2W1.