PALEOPATHOLOGY: SIGNS AND LESIONS IN SKELETAL REMAINS OF EPIDEMICS AND DISEASES OF BIBLICAL TIMES IN SYRO-PALESTINE

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Submitted in fulfilment of the requirements for the degree of

MASTER OF ARTS

in the subject

BIBLICAL ARCHAEOLOGY

at the

UNIVERSITY OF SOUTH AFRICA

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NOVEMBER 2005

DECLARATION

I DECLARE THAT **PALEOPATHOLOGY: SIGNS AND LESIONS IN SKELETAL REMAINS OF EPIDEMICS AND DISEASES OF BIBLICAL TIMES IN SYRO-PALESTINE** IS MY OWN WORK AND THAT ALL THE SOURCES THAT I HAVE QUOTED HAVE BEEN INDICATED AND ACKNOWLEDGED BY MEANS OF COMPLETE REFERENCES.

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NOVEMBER 2005

ACKNOWLEDGEMENTS

I have the greatest respect and admiration for my study leaders, Prof W S Boshoff and Dr M le Roux. They have supported me in difficult circumstances and inspired me to reach ever higher. My gratitude for the other members of the biblical archaeological department for their continued support: Prof C Scheepers and Dr F Kloppers, for the secretaries Ms Rootman and Ms Pieters. I would like to convey a special thanks to Ms E Nell who was a pillar of strength to rely on for the study material.

The relationship of Miriam and Moses comes to mind when I want to thank my sister, Ms Marié Mongiat, whose influence in my life is beyond praise. She has inspired me to continue with my studies, was the typist and editor of this dissertation and has supported me through several years.

This study is dedicated to my sister Marié and my children Tanya, Brittani and Romi, and in remembrance of my father Willem (25-1-1910 – 18-5-1999) and my only son Willem who died too soon (23-3-1976 – 20-8-2003).

All glory to God.

SUMMARY

This dissertation deals with the study of ancient diseases mentioned in the historical period of the Scriptures in the region of Syro-Palestine. The definition, history, methodology and etymology of the terms relating to biblical diseases are discussed. Leprosy, syphilis, plague and anaemia amongst other diseases leave skeletal signs and lesions. Paleopathologists may reveal these diseases by studying skeletal remains of the population of Syro-Palestine.

Criticisms and recommendations are offered for the practical paleopathologist, anthropologist or archaeologist. More interest should be taken in the study of coprolite in every new discovery of human remains. The scarcity of skeletal remains in the region is well known. The past and present law structure, the Halakah, may partly be to blame.

The future of paleopathology worldwide is undisputedly the biochemical science of DNA analysis. With this new science the role for macromorphological examination may diminish. The diseases mentioned in the Bible are finding it increasingly difficult to hide behind the words in the Scriptures.

Key words

Archaeology, paleopathology, coprolite, leprosy, treponematosis, tuberculosis, biomolecular, DNA, cribra orbitalia, ancient Israel, Near East, Old and New Testament diseases.

TIMELINE

Prehistoric	**1 000 000 – 3300 BCE**
Neolithic	**8 300 – 4 500 BCE**
Chalcolithic	**4 500 – 3200 BCE**
Early Bronze Age	**3 200 – 2 200 BCE**
Middle Bronze Age	**2 200 – 1 550 BCE**
Late Bronze Age	**1 550 – 1 200 BCE**
Iron Age I	**1 200 – 1 000 BCE**
Iron Age II	**1 000 – 586 BCE**
Babylonian Period	**586 – 539 BCE**
Persian Period	**539 – 332 BCE**
Hellenistic Period	**332 – 141 BCE**
Hasmonean Period	**141 – 37 BCE**
Roman Period	**37 BCE –476CE**
Byzantine Period	**324 –1453 CE**
Arab Period	**638 – 1516 CE**
Crusader Period	**1 099 – 1 291 CE**
Ottoman Period	**1 517 – 1 917 CE**

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GLOSSARY

Ague: malarial fever or a chill.

Alkalosis: a pathological condition resulting from accumulation of base or loss of acid in the body and resulting in increase of pH.

Allele: any of two or more genes that are responsible for alternative characteristics, such as smooth or wrinkled seeds in peas.

Allergen: a substance which is capable of inducing an allergy or specific susceptibility; it may be a protein or a nonprotein.

Alveolar: pertaining to alveolus, the sockets of either jaw in which the roots of the teeth are imbedded.

Amylogenesis: the formation of enamel of teeth.

Amylogenesis imperfecta: abnormal development of enamel.

Anaemia: reduced oxygen carrying ability of blood resulting from too few erythrocytes or abnormal haemoglobin.

Antigen: a substance or part of a substance (living or nonliving – usually a protein) that is recognized as foreign by the immune system, activates the immune system and reacts with immune cells or their products.

Arthritis: inflammation of the joints.

Aetiology: refers to the cause of a disease.

Askariasis: a state of being infected with intestinal worms of the genus ascaris.

Atrophy: wasting away or diminution in the size of cells.

Autosomes: chromosomes number 1 to 22; do not include the sex chromosomes

Avitaminosis: a condition due to a deficiency of vitamins in the diet.

Bacillus (plural bacilli): a genus of microorganisms of the family Bacillaceaca. Bacillus is Latin for 'little red'.

Base: proton receptor, substance capable of binding with hydrogen ions.

Buccal: of cheeks: relating to or forming part of the cheek.

Calcaneus (plural calcanei): the largest tarsal bone, forming the heel bone.

Calvarial: skull, cranium.

Cardiovascular:pertaining to the heart and the blood vessels.

Cervical: pertaining to the necks of teeth, the surface adjacent to the gingival tissue.

Chagas disease: infection caused by the parasite trypanosoma. Causing sleeping sickness.

Chancre: primary lesion of syphilic, reddish ulcer covered with yellowish excudate.

Collagen: the main supportive protein of skin, bone cartilage and connective tissue.

Conjunctivitis: inflammation of the conjunctiva.

Corynobacterium: the causitive bacteria of diphtheria.

Craniometry: the scientific measurement of the dimension of the bones of the skull and face.

Cranium: All the bones of the skull except the mandible (some exclude the facial bones also).

Cribra orbitalia: small apertures in the lamina cribrosa which give the bone a porous appearance.

Cuticular: skin formed upon a sore or a wound.

Diagenetic: recombination or rearrangement of constituents (as of a chemical or mineral) resulting in a new product.

Diaphysis: the portion of long bone between the extremities – also called the shaft.

Diploid bone: the loose osseous tissue between the two tables of the cranial bone (plates).

Epiphysis (Greek: an ongrowth): the end of a long bone, usually wider than the shaft.

Erythrocytes: red blood cells.

Escherichia coli: a species of microorganism constituting the greater part of the intestinal flora of humans.

Etymology: the history of a linguistic form (as a word) shown by tracing its development since its earliest recorded occurrence in a language.

Falciparum malaria: most serious form of malaria, caused by Plasmodium falciparum.

Favus: a distinctive type of tinea capitis (see below).

Frontal bone: a cranial bone.

Gamete: sex cell; sperm or oocyte (egg).

Gastritis: inflammation of the stomach.

Genome: the total genetic structure of an organism, the mastercell with genetic instructions that rules the human biology.

Granulation: a small, round abnormal mass of lymphoid tissue.

Granuloma: a tumour or neoplasm made up of granulation tissue.

Haematopoiesis: blood cell formation.

Haemapoietic: production of blood cells directly from the stem cells.

Haemoglobin: oxygen transporting component of red blood cell.

Haemolysis: the liberation of haemoglobin; the separation of haemoglobin from the red blood cells.

Haematogenous: produced by or derived from the blood, disseminated by the circulation or through the blood stream.

Haematogenous dissemination: spreading (of bacteria) through the bloodstream.

Helminthiasis: worm infestation, or infestation of parasitic worms or disease caused by this.

Heterozygote: an animal or plant that is heterozygous: a hybrid.

Heterozygous: (of an organism) having dissimilar alleles for any one gene.

Histology: microscopic study of tissue.

Homozygote: organism with two identical genes at the same place on the two corresponding chromosomes.

Hyaline: glassy or transparent.

Hypersplenism: the exaggeration of destructive function of the spleen, resulting in deficiency of blood elements.

Hypertrophia: the morbid enlargement or overgrowth of an organ or part due to the increase in size of its constituent cells.

Hypomelanotic: disease causing depletion of the dark pigment of the skin.

Hypoplasia: defective or incomplete development of enamel.

Idiopathic: without apparent cause. Used to describe a disease or disorder that has no known cause.

Incisal: cutting edge of anterior teeth.

Influenza orthomyxovirus: infectious and epidemic viral disease causing flu.

Intra vitam (Latin): during life.

In utero: within the uterus.

Involucrum: a covering or sheath, such as contains the sequestrum of a necrosed bone.

Isotope: a chemical element having the same atomic number as another (same number of nuclear protons) but having a different atomic mass (different number of nuclear neutrons).

Lacrimal fossa: the hollow or depressed area of the bone containing the tear gland.

Lacunae (plural): a defect, pit or groove in developing bone that is undergoing resorption, frequently found to contain osteoclasts.

Lupus erythromatosis: a superficial inflammation of the skin, with disclike patches with raised reddish edges and depressed centres and covered with scales or crusts.

Lupus vulgaris: a tuberculous disease of the skin and mucous membranes marked by the formation of brownish nodules in the centre (corium).

Lymphadenopathy: disease of the lymph nodes.

Lymphogranulomatosis: infectious granuloma of the lymphatic system.

Mandible: the lower jaw.

Matrix: the groundwork on which anything is cast – the basic material from which things develop.

Maxilla: the upper jaw.

Metacarpals: the part of the hand between the wrist and the fingers.

Metatarsus: the part of the foot between the tarsus and the toes.

Morbidity: describes the occurence of illness.

Morphogenesis: the evolution and development of form.

Mortality: refers to death.

Myelosis: the proliferation of marrow tissue which produces the blood changes of myeloid leukaemia.

Neuropathy: functional disturbances and/or pathological changes in the peripheral nervous system.

Necrophilia: morbid attraction to corpses or dead matter.

Occipital bone: a cranial bone.

Occlusal: masticating surface of molar or premolar teeth.

Ochronosis: a peculiar discolouration of certain tissue of the body, caused by the deposit of alkapton bodies as the result of a matabolic disorder.

Orbit: the bony cavity that contains the eyeball.

Osteitis: inflammation of bone involving the haversian spaces and canals.

Osteitis fibrosa generalisata: a disease characterised by thickening, weakening and deformity of bone – caused by the parathyroid glands.

Osteoarchaeology: archaeological study of bones or skeletons.

Osteoblasts: bone forming cells.

Osteoclasts: mature bone cells.

Osteochondritis: inflammation of both bone and cartilage.

Osteogenesis: process of bone formation, ossification.

Osteoid: unmineralized bone matrix.

Ossification: the formation of bone or a bony substance; the conversion of fibrous tissue or of cartilage into bone.

Osteomalacia: a condition marked by the softening of bones, with pain and tenderness and loss of weight.

Osteoporosis: increased softening of bone resulting from a gradual decrease in rate of bone formation.

Papilloma: a branching or lobulated benign tumour derived from epithelium.

Papule: a small circumscribed solid elevation of the skin.

Paranasal: adjacent to the nares (nose).

Paranasal sinus: (also frontal sinus): air cavities in the cranial bone communicating with the nasal cavity.

Parietal bone: a cranial bone.

Pathogen: any disease producing microorganisms or foreign material (e.g. mycrobacterium leprae causing leprosy or pollen causing hay fever).

Pathogenesis: giving origin to disease or to morbid symptoms.

Pathogenetic: giving origin to disease or to morbid symptoms.

Pathognomonic: specifically distinctive or characteristic of a disease or pathologic condition.

Periapical: around the apex (of the root) of a tooth.

Phagocyte: any cell that ingests (eats) another cell or foreign particle.

Phalanges (plural): any bone of the finger or the toe.

Polymorphism: being polymorphic – appearing in different forms in different stages of development.

Psoriasis: a chronic recurrent dermatosis – distinctive lesion being a silvery scaly plaque.

Pyogenic: producing puss.

Pyogenous: caused by puss.

Retrovirus: a type of virus whose genetic information is contained in RNA rather than DNA.

Rhinitis: inflammation of the mucous membrane of the nose.

Scheuermann's disease (kyphosis): osteochondrosis of the vertebrae.

Schistosomiasis: infection caused by the flukes (parasitic flatworm) of the genus schistosoma (bilharzia).

Sequestrum: a piece of dead bone that has become separated during the process of necrosis from the sound bone.

Solar keratosis: a horny growth or scaly wart on the skin caused by excessive exposure to the sun.

Spirochete: a spiral-shaped bacterium belonging to the order spirochaetales.

Spore: the reproductive element of one of the lower organisms such as protozoa.

Subchondral: beneath a cartilage.

Subcutaneous: situated or occurring beneath the skin.

Table: pertaining to the outer or inner plates of the cranium.

Talipes equinovarus: clubfoot

Temporal bone: a cranial bone.

Thyrotrophic: pertaining to or having an influence on the thyroid gland.

Tinea capitis: fungal infection of the scalp.

Trabeculla: strand of anchoring connective tissue in the cranium.

Trachoma: a viral disease of the conjunctiva and cornea of the eye.

Transplacental: the crossing of the placenta from the mother to the foetus.

Trepanation: the operation with a trepan; the excision of a disc of the skull.

Treponeme: an organism of the genus treponema, syphilitic organism.

Trismus nascentium: inability to open the jaws, often seen in newborns.

Truncate: amputate.

Trypanosomiasis cruze: infection caused by the protozoa of the genus trypanosoma.

Ulcero nodule: a small node, hard to the touch, that has become ulcerated.

Vault: the dome of the cranium.

Vertiligo: an ideopathic condition characterised by failure of the skin to form melanine – also called leucoderma.

Zymosis: any infectious or contagious disease; fermentation; growth of bacteria and their products.

Zymotic: caused by or pertaining to zymosis.