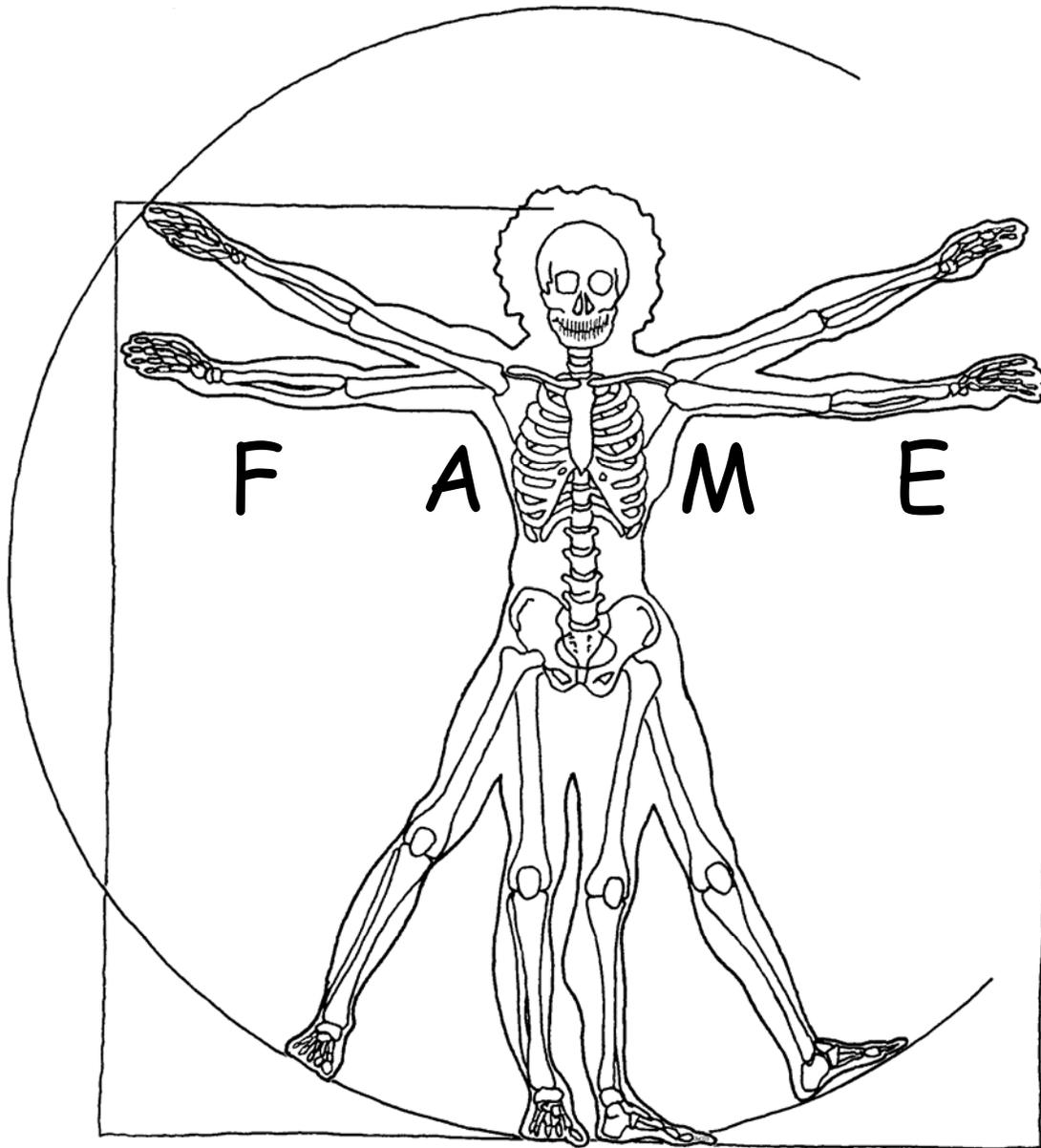


Fysisch-Anthropologische Mededelingen



Newsletter of the Dutch Association of Physical Anthropologists

No. 12, January 2004

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From the editors

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A new issue of Fame with a new cover.

Like the previous issue of FAME, this one also is a bit special. Last November, we celebrated our 20th anniversary, with the very successful congress 'Man Unravelling. Bones, Teeth and Genes'. We are very grateful to Naturalis and 3M for their cooperation in organising this congress.

The congress was very well attended with nearly 100 participants, many from our own association. Several of our members were, however, unable to attend and we therefore thought it a good idea to open this issue with the abstracts of the lectures given at the congress. Some of these abstracts are slightly longer than the ones that appeared in the official programme but we thought that you might be interested to read these unabridged versions.

Thanks to contributions from a few very diligent members, we managed again to cobble together another FAME for all our members.

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Congress abstracts

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**MASS GRAVE OF NAPOLEON'S GREAT ARMY (1812) IN VILNIUS, LITHUANIA: ANTHROPOLOGICAL REVIEW OF THE CASE**

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Introduction

A mass grave was discovered during construction work on the site of former barracks of the Soviet Army, in the northern suburbs of Vilnius (Verkių Street, Šiaurės Miestelis Territory) in the late autumn of 2001. Preliminary observations made on uniform remains (especially buttons showing the Imperial Eagle and numbers of regiments) led to the conclusion that this mass grave was one of the Great Army commanded by Napoleon I. This discovery confirmed historical records describing the burial of about 37,000 dead Grande Armée soldiers in 8 locations by the troops of Koutouzov and local inhabitants. The place for inhumation was well chosen – at the beginning of July 1812 French troops built defense line on hills, which consisted of a system of trenches and redoutes for the artillery and infantry. According to Russian administration reports, corpses were buried in this location in two places, totalling 7190 soldiers and 112 horses. Locating the second place of burial is very problematic, as the area is now completely urbanized. Field observations correspond with an extremely cold winter (below 30°C on December nights) recorded in Vilnius at the time, suggesting that, more than a typhus epidemic, the cold together with exhaustion and starvation was the main cause of death.

This exceptional osteological sample is being studied in detail (including biomolecular analysis) in the laboratory, as it represents a unique source of data from the beginning of the 19th century regarding the population of Europe.

The value of data for mass grave analysis to a great extent depends on the quality of the excavation during fieldwork. During the rescue excavation in early spring and September of 2002, an area of c. 600 sq. metres was investigated. The objectives of

the work were to excavate the site in the shortest possible time so as not to delay the construction work, and at the same time to collect a maximum of data.

### Material and Methods

During the excavation, physical anthropologists together with archaeologists identified and recorded the position of the bodies, finished their unearthing and removal from the pit. French anthropologists applied their qualitative approach in the field, using the methodology of funeral or forensic anthropology, previously applied on other sites (Area 1). The essence of the method is to detect all possible details on the site. Lithuanian archaeologists and anthropologists used the quantitative approach, identifying only some skeletons on the site and relying more on subsequent laboratory work (Area 2). In September 2002, the rest of the site (Area 3) was examined by the Lithuanian part of the team, applying elements of a qualitative approach.

During the subsequent laboratory analysis, the minimum number of individuals, sex, age, stature, dental status and pathologies (for individuals taken as separate skeletons), and only sex and pathologies for the rest of the materials were recorded using conventional methods of forensic anthropology.

### Results and Discussion

From the excavated areas, the minimum number of individuals retrieved (based on the maximum number of fragments – in our case diaphyses of the left femora) was 2865, to which 404 unattributed individuals (collected during construction work and by police officials) were added, resulting in a total minimum number of individuals of 3269, when all left femoral diaphyses were pooled. Only 1048 of these (36.6%) were identified on the site.

From the total sample, the sex was identified for 1952 individuals; among these, 97.6% were male and 2.4% female.

The age at death was determined with 5 year intervals for 435 males. 10.6% were under 20 years of age and, 48.0% were 20-25 years; among 13 females, the age at death of 4 was under 20 years, while 7 were 20-25 years.

The average stature of males was 170.9 cm (min. 156.6, max. 187.0). The almost complete absence of *cribra orbitalia*, and the low severity and frequency of stress episodes evaluated by the incidence of linear enamel hypoplasia indicate that the individuals had good enough living conditions to prevent stresses in childhood, which would mean that a selection of recruits according to certain health standards had taken place.

Antemortal teeth loss was 2.67% (molars prevailing). A low attrition and low general

caries rate (predominantly caries of contact and occlusal surfaces) but a high ratio of caries complications and dental calculi indicate a relatively high consumption of refined carbohydrates and bad oral hygiene.

An analysis of other pathologies revealed a low number of traumas. The unhealed traumas cannot be associated with combat wounds. Most often found were perimortal spiral and comminuted fractures of long bones resulting from forceful bending or from blows with blunt objects. Most probably these traumas occurred during rough handling of the bodies during their disposal. Only two cases were found of lesions on tibias made with cutting instruments (probably resulting from attempts to remove shoes from the frozen bodies during looting). Traces of 34 healed traumas were identified. It is notable that these fractures of long bones were well consolidated and with minimal deformation, suggesting good qualifications of the surgeons and/or a selection of the conscripts.

Several cases of pathologies typical of heavy physical strains were detected on the soldiers (especially infantry): 8 cases of Scheuermann's disease of the spine, and 6 cases of "marching foot" (healed fatigue fractures of the metatarsals). At least 3 not completely healed traumas were found on soldiers who were wounded during this campaign but were still with active troops.

Few traces of specific (tertiary syphilis) and unspecific infectious diseases and habitual modifications of bones and teeth were noted.

### Conclusions

A qualitative approach increases the completeness of data in subsequent laboratory work. However, local conditions and cost effectiveness should be taken into account. Provisional results would suggest that the character of inhumation, the age and sex composition, the comparatively low incidence and peculiarities of traumas and other pathologies confirm historical evidence that these soldiers died not in combat but mainly from starvation, exhaustion, cold and, possibly, typhus.



Femke E. Rijpma  
Barge's Anthropologica

Around AD 1200 new religious ideas spread all over Europe, and many new orders were founded, such as for instance the Franciscan order. Also many women were attracted to the new religious ideas. Beguines were women who followed an austere life, without taking religious vows or entering a convent. They lived in cities, alone or in groups.

Beguines were regarded as a threat by the Catholic Church because women were not supposed to concern themselves with theological problems and because they could not be controlled by a regular confessor or put behind convent walls. In AD 1318, Pope John XXII banned the movement. Only those beguines who were already living together in beguinages (begijnhoven) could continue their way of life and were placed in the care of a priest.

Beguines were self-supporting. They earned their living by working as maids in beguine households or by repairing cloths in factories. We know that in the late Middle Ages the beguines of Breda were economically important to the city. But, what do we know about the health of the beguines? How were these beguines doing economically compared to other women of the same period?

In the 1995 excavation of Park Valkenberg in Breda, the Beguinage churchyard was uncovered. The following year 120 skeletons arrived at the *Barge's Anthropologica Institute* of the University of Leiden Medical Centre (LUMC) for further research. Ninety women, nine men and seven children (younger than 19 years) were recognised. A woman could enter a Beguinage as a widow and bring her children with her. We know from historical sources that the male bodies buried in the Beguinage churchyard often belonged to the priests.

Two indicators, length and age, can inform us about the health of a population. The average age at death of the Beguines (N=78) is 43.1 years; the average length (n=50) is 159.9 cm. When comparing these women with other groups of women from the same time span we should be able to say something about their health. A comparison was made with groups from Delft, Gorinchem and Dordrecht.

The average stature of the Beguines appeared to be somewhat smaller than the other three groups of women. A uni-variate analysis of variance (General Linear Model) and an Independent Sample T-test revealed no significant difference in stature or age between the Beguines and the other populations. The living conditions of these women seemed to have been comparable to those of the other women.



## **THE FEASIBILITY OF ODONTOMETRIC SEX DETERMINATION**

Ghislaine N. Wilgerson and Raphaël G.A.M. Panhuysen

Saint Servatius Project, Amsterdam Archeological Centre, University of Amsterdam

### Introduction

In osteoarcheological studies the sex of human skeletal remains is often determined by examination of the bones of the pelvis and skull. Frequently used methods, such as those recommended by the Workshop of European Anthropologists [1], rely largely on a non-metrical assessment of morphological differences between males and females in these bones. Metrical assessment of sexual dimorphism in bones like the humerus, the femur or the calcaneus is less often used to determine sex. In cases of poorly preserved skeletal material, not uncommon in Dutch archaeology, non-metrical morphological sex determination methods may not be applicable or may yield no reliable results. As teeth, in particular enamel crowns, often survive better than bones in the soil, it would be practical to be able to determine sex by means of a metrical assessment of sexual dimorphism in dental elements. Since the 70s various scholars have studied sexual dimorphism in teeth, and odontometric data have been used as a means to determine sex in a growing number of studies. [3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13] Until now odontometric data have seldom been used to determine sex of cemetery populations in the Netherlands. In a recent study Corten examined and measured dental remains from a late Roman – early medieval cemetery in Nijmegen. [14] The objective of this study is to examine the correlation between sex as established by non-metric morphological sex determination and two basic measurements of tooth crowns. It is our aim to assess the feasibility of odontometric sex determination. In case a strong correlation exists between sex and tooth dimensions, an attempt may be made to develop metric criteria for Dutch populations. For this purpose we studied human skeletal remains of a sample from the cemetery population excavated at the Pandhof excavation at the Saint Servatius church site in Maastricht.

### Material and methods

At the Pandhof site (excavated 1953-1954) circa 450 graves were excavated in a courtyard adjacent to the Saint Servatius church. The skeletal remains recovered from these graves date from the late Roman through the Carolingian period (AD 350-950). Dental remains were collected from around 265 of these individuals. For this study the dentition of 60 adult individuals, viz. 30 males and 30 females, were examined and

measured. Data related to completeness of the skeleton, sex, age at death, stature, pathology and metric and non-metric variation were recorded in a standardised way based on common methods such as those recommended by the Workshop of European Anthropologists. The skeletal remains of those 60 individuals that were selected for this study were exposed to a detailed examination of the dentition. Besides a general dental inventory, which included the number of (lost) teeth, the presence of atrophy, calculus, periodontitis, and any dental pathology, a more extensive dental examination was carried out which focused on the measurement of dental elements. Apart from the lateral (second) incisors all available teeth were measured. Two dimensions were recorded for the tooth crowns: firstly the mesiodistal diameter and secondly the buccolingual diameter which is taken perpendicular to the mesiodistal diameter. For measurements of the mesiodistal lengths, a digital Hillson-FitzGerald dental calliper with small tips was used. Measurements of the buccolingual diameter were taken using a standard digital spreading calliper. Both measurements were taken according to the Chicago Standards protocol [2]. All data were recorded in a database and statistically analysed using SPSS 11.

## Results

Table 1. Mean size in millimetres of the four canines as indicated by the respective FDI-numbers by sex, difference is the mean difference in millimetres between the male and female diameter; n indicates the number of inspected elements. The p-value was calculated on the basis of an independent samples T-test.

	Buccolingual diameter											
	1.3	s.d.	n	2.3	s.d.	n	3.3	s.d.	n	4.3	s.d.	n
Male	8.50	0.53	13	8.48	0.48	12	7.99	0.64	11	7.74	0.74	15
Female	7.97	0.55	20	8.06	0.45	16	7.28	0.46	16	7.29	0.48	16
Difference	0.53			0.42			0.71			0.45		
P (signif.)	0.010			0.025			0.003			0.055		

A total of 1922 teeth and alveoli were examined; odontometric data were collected for 921 elements. In 762 elements the buccolingual diameter could be recorded and in 865 elements the mesiodistal diameter was measured. Generally metric sexual dimorphism was most marked in the buccolingual diameter of the canines (1.3, 2.3, 3.3 and to a lesser degree 3.4). In the 119 canines in which the buccolingual diameter could be measured, the difference between the means calculated for males and females ranged from 0.42 to 0.71 millimetres. Still, for all canines the standard deviation indicates there was considerable overlap in the values found for males and females.

### Discussion and conclusion

The results of this study corroborate previous studies [e.g. 5, 8, 11, 12] that concluded that the canines generally display the highest degree of sexual dimorphism. However, the results of this study indicate there was a considerable amount of overlap in the diameters of the canines. This implies that it is difficult to develop criteria for odontometric sex determination of the canines. Two approaches may in the future lead to improved criteria: the use of cumulative values or ratios and expansion of the sample, by measuring more canines from this and other late Roman and early medieval samples.

### References

- [1] Workshop of European anthropologists, 1980. Recommendations for Age and Sex Diagnoses of Skeletons, in: *Journal of Human Evolution* 9, 517-549.
- [2] Buikstra, J.E. and D.H. Ubelaker (eds), 1994. Standards for data collection from human skeletal remains, Arkansas Archaeological Survey Research Series no. 44, Fayetteville.
- [3] Arya, B.S. et al, 1974. Relation of sex and occlusion to mesiodistal tooth size, in: *American Journal of Orthodontics* 66 (5), Portland, 479-486.
- [4] Black, T.K., 1978. Sexual Dimorphism in the Tooth-Crown diameters of the Deciduous Teeth, in: *American Journal of Physical Anthropology* 48, New York, 77-82
- [5] Garn, S.M., A.B. Lewis and R.S. Kerewsky, 1964. Sex difference in tooth size, in: *Journal of Dental Research* 43, Chicago, 306.
- [6] Garn, S.M., P.E. Cole and W.L. Van Alstine, 1979. Sex Discriminatory Effectiveness Using Combinations of Root Lengths and Crown Diameters, in: *American Journal of Physical Anthropology* 50, New York, 115-118.
- [7] Lucy, D., A.M. Pollard and C.A. Roberts, 1994. A Comparison of Three Dental Techniques for Estimating Age at Death in Humans, in: *Journal of Archaeological Science* 22, London, 417-428.
- [8] Lund, H., 1999. Gender determination by odontometrics in a Swedish population, in: *Journal of Forensic Odontostomatology* 17 (2), Johannesburg, 30-34.
- [9] Muller, M. et al, 2001. Odontometrical method useful in determining gender and dental alignment, in: *Forensic Science International* 121 (3), 194-197.
- [10] Ditch, L.E. and J.C. Rose, 1972. A Multivariate Dental Sexing Technique, in: *American Journal of Physical Anthropology* 37, New York, 61-64.
- [11] Pettenati-Soubayroux, I., M. Signoli and O. Dutour, 2002. Sexual dimorphism in teeth: discriminatory effectiveness of permanent lower canine size observed in a

- XVIIIth century osteological series, in: *Forensic Science International* 126, 227-232.
- [12] Teschler-Nicola, M., 1992. Sexualdimorphismus der Zahankronendurchmesser. Ein Beitrag zur Geschlechtsdiagnose subadulter Individuen anhand des frühbronzezeitlichen Gräberfeldes von Franzhausen I, Niederösterreich, in *Antropologische Anzeiger* 50, 51-65.
- [13] Teschler-Nicola, M. and H. Prossinger, 1998. Sex Determination Using Tooth Dimensions, in: Alt, Rösing & Teschler-Nicola: *Dental Anthropology. Fundamentals, Limits and Prospects*, Vienna.
- [14] Corten, F., 2002. Grafveld Mariënborg, Nijmegen, (unpublished report), Nijmegen.



## **NOSE SHAPE, CLIMATE AND VARIATION**

Tj.D. Bruintjes  
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Many anthropologists have been puzzled by the shape of the human nose because of its peculiar form as well as the enormous variation in nasal morphology. For instance, the anthropologist Hooton in his textbook 'Up from the Ape' could not explain the distinctive external form of the nose among humans and concluded that "our peculiar nasal form is a mere exuberant variation of no functional significance" (Hooton, 1960).

In general, species-wide variation in the human body correlates with environmental factors. The strongest findings have linked climate to body weight, body proportions, skin pigmentation and, last but not least, nose shape, expressed as the nasal index (Carey and Steegmann, 1981).

The nasal index is the width of the nose divided by the height of the nose, multiplied by 100. Actually, this is the proportion the width of the nose bears to its height. The nasal index can be determined in the living as well as on the skull. In the living, the height of the nose is measured from the point overlying the nasion (paranasion) to the juncture of the septum with the upper lip (subnasale). The breadth (or width) of the nose is the distance between the alae. Both measurements are made with a caliper. On a skull, the height of the nose is measured from the nasion to the anterior nasal spine, the breadth is the greatest distance between the edges of the pyriform aperture.

Noses can be classified as leptorrhine, mesorrhine or platyrrhine. In the living, if the

index falls under 70, the nose is said to be leptorrhine (narrow-nosed), if over 85 the nose is said to be platyrrhine (broad-nosed) (Knussman, 1988).

Thomson and Buxton were the first to relate the nasal index to climatic conditions (Thomson and Buxton, 1923). They correlated the average nasal index of various groups of living populations with the average temperature and average humidity, and concluded that “a platyrrhine nasal index is associated with a hot, moist climate, and a leptorrhine nasal index with a cold, dry climate” (Figure 1).

Weiner re-examined the data of Thomson and Buxton and found that the strongest correlation existed between nasal index and absolute humidity (=vapor pressure of the air) (Weiner, 1954). This means that in a moist climate, the nasal index is high.

Carey and Steegmann (1981) found similar correlations when looking at the relationship between human nasal protrusion (absolute nasal projection) and climate: dry, cold conditions are associated with more protrusive noses.

From a physiological point of view the fact that a narrow, projecting nose fits a cold, dry climate is not very surprising. The leptorrhine nose possesses a narrow, slit-like passage inside the nose, the so-called nasal valve (Bruitjes, 1996). This nasal valve is a specific adaptation for the purpose of changing the laminar flow pattern of the inspired air into a turbulent airflow. This, in turn, facilitates warming and moistening of the inspired air. It also facilitates moisture retention from the expired air, a process which in some animals is of the greatest importance (Schmidt-Nielsen, 1972).

In hominid evolution there is a clear shift in nasal morphology with the emergence of *Homo erectus* 1.6-1.5 million years ago (Franciscus and Trinkaus, 1988). The nose changed from flat, nonprojecting in *Australopithecus* into a fully anteriorly positioned external nose in *Homo erectus* (the morphology of the nose in fossil hominids can be assessed from skeletal features, e.g. the form of the nasal bones and development of the anterior nasal spine).

Interestingly, the emergence of *Homo erectus* coincides with a significant dispersal of hominoids into cold, arid environments outside Africa. This suggests that the anteriorly positioned, narrow external nose was an adaptation to the new climatic conditions.

Traditionally, changes in nasal morphology in hominid evolution have been viewed largely in terms of a passive, secondary response to the gradual retrusion of the mid-face and dental arch (Franciscus and Trinkaus, 1988). This model of passive nasal projection is probably important, but the correlation between climatic conditions and nose form in *Homo sapiens* makes it likely that the shift in nasal morphology within the hominid lineage can be related to a shift in respiratory physiology.

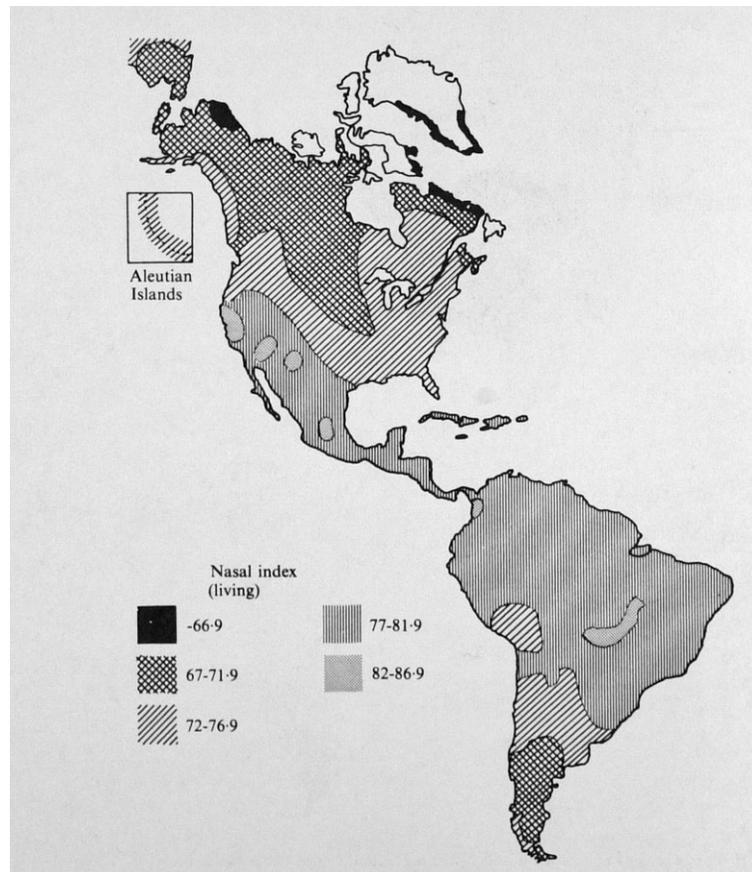


Fig 1. Map of the American continent showing the geographical distribution of the nasal index in the living, illustrating the relationship between nasal index and climate conditions (after Young, 1971).

#### References

- Bruintjes, Tj.D., 1996. *On the Functional Anatomy of the Nasal Valve and Lobule*. Thesis, Utrecht University.
- Carey, J.W. and A.T. Steegmann, 1981. Human nasal protrusion, latitude and climate, *American Journal of Phys. Anthrop.* 56: 313-319.
- Franciscus, R.G. and E. Trinkaus, 1988. Nasal morphology and the emergence of *Homo Erectus*, *American Journal of Phys. Anthrop.* 75 :517-527.
- Hooton, E.A., 1960. *Up from the Ape*. 9<sup>th</sup> ed. Macmillan, New York.
- Knussman, R., 1988. *Anthropologie: Handbuch der Vergleichenden Biologie des*

*Menschen*. Vol. 1, Part 1. Gustav Fischer, Stuttgart.

Schmidt-Nielsen, K., 1972. *How Animals Work*. Cambridge University Press.

Thomson, A. and L.H.D. Buxton, 1923. Man's nasal index in relation to certain climatic conditions, *Journal of the Royal Anthropol. Inst.* 59 :92-122.

Weiner, J.S., 1954. Nose Shape and Climate, *American Journal of Phys. Anthropol.* 12: 615-618.

Young, J.Z., 1971. *An Introduction to the Study of Man*. Oxford University Press.



### **Searching for Late Pleistocene modern humans at Punung, East Java**

Paul Storm

Knowledge about Late Pleistocene *Homo sapiens* in Indonesia is very limited and the late occurrence of *Homo erectus* is fiercely debated (Swisher III et al., 1996; Grün and Thorne, 1997). Relevant in this debate is the question whether hominids were able to survive in a tropical rainforest environment (Pope, 1995; Storm, 2001). In the 1930s Von Koenigswald collected a fauna from two Pleistocene deposits, close to the village of Punung, East Java, in which hominid remains were found in association with mammals which clearly indicate the presence of a tropical rainforest: orang-utans (*Pongo pygmaeus*), gibbons (*Hylobates*) and sun bears (*Helarctos malayanus*). Although the Punung fauna is of a great scientific importance for understanding the distribution and evolution of hominids in Australasia, the location of the deposits was unknown. In the late 1990s Bosscha Erdbrink, who was present during the excavations in the 1930s, released photographs made by him and he expressed his willingness to help locate the original sites. Thanks to financial support by the Leakey Foundation, a joint Indonesian-Dutch team of the Geological Museum at Bandung and Naturalis at Leiden were able to visit the region of Punung in September 2003. This visit successfully resulted in the location of the two original sites. Punung 1 is very close to another site, named Song Agung, and Punung 2 is near the entrance of the well-known cave of Gua Tabuhan. In addition, we found, for the first time in Java, fossils in situ stemming from a tropical rainforest at a new site, Gunung Dawung (close to the cave of Gua Tabuhan). In my opinion, the Punung fauna, which is younger than the Ngandong fauna (including *Homo erectus*) but older than the Wajak fauna (including *Homo sapiens*), must play a major role in future discussions on the dispersal and evolution of humans in Indonesia.



## **UNRAVELLING MAN'S HISTORY USING DNA OF THE LIVING?**

Peter de Knijff

no abstract available



## **THE ORIGIN OF OUR SPECIES**

Chris Stringer

The Natural History Museum, London

Fossil and genetic evidence suggest that our species originated in Africa during the last 300,000 years. The early records of that evolution are scattered and not always well-dated, and it is currently unclear how large was the centre of origin in Africa, and how varied was the ancestral population. Recent evidence points to East Africa as playing a central role, but by about 100,000 years ago, early modern human groups were present at opposite ends of the continent, and even beyond, in Israel. Genetic data suggest that population diversification was already occurring by that time. In this presentation I will discuss what we know about modern human origins from the fossil record and the extent to which that record matches genetic and archaeological data.



## MAN UNRAVELLED? IN HET CENTRUM VAN BIODIVERSITEIT

Paul Storm

Het heeft geen zin het te ontkennen, ik ben bevooroordeeld. Hoe kan je als gastmedewerker van Naturalis en al jarenlang lid van de Nederlandse Vereniging voor Fysische Antropologie een neutraal stukje schrijven over een dag die door beide bovengenoemde organisaties was georganiseerd? Bovendien was ik voorzitter van het organiserend comité en één van de sprekers op dit congres. Hoe moet ik verkopen dat zaterdag 8 november, de dag dat we in Naturalis het congres "Man Unravelled? Bones, Teeth and Genes" hadden, een zeer geslaagde dag was?

Laat ik beginnen met de basis; de catering was uitstekend verzorgd en de technische begeleiding was opvallend goed. Wij hadden professor Chris Stringer van het Natuurhistorisch Museum in Londen gevraagd de dag af te sluiten met zijn lezing "The Origin of Our Species". Hij gaf ons een zeer helder en onderhoudend beeld van zijn visie op het ontstaan van de moderne mens (*Homo sapiens*). Chris blijft, na vele jaren van onderzoek, onderstrepen dat onze soort in Afrika is ontstaan. Hij is een man met veel internationale ervaring, en hij moet in zijn lange loopbaan heel wat zalen van binnen hebben gezien. Na afloop nam hij de moeite Dennis Verplancke persoonlijk te bedanken. Niet voor niets, met de zenuwen in je lijf (nu spreek ik voor mijzelf) is het een aangename ervaring om voor je gevoel in een warm technisch bad te stappen.

Bij het organiseren van een congres als dit probeer je rekening te houden met de verschillende onderwerpen die een rol spelen binnen de fysische antropologie. De "Bones" kwamen ruimschoots aan bod bij de lezing van de eerste spreker Professor Rimantas Jankauskas van de Universiteit van Vilnius, Litouwen. Ik vermoed dat alleen de titel van zijn lezing al, menigeen op het puntje van zijn stoel heeft gezet, "A Mass Grave of Napoleon's Great Army (1812) in Vilnius". Zijn conclusie was verrassend. Je verwacht in zo'n massagraf de resten van afgeslachte soldaten aan te treffen, skeletten vol sporen die wijzen op een gewelddadige dood. Niet dus, de meeste soldaten waren daar gestorven als gevolg van de koude, uitputting en uithongering.

Ghislaine Wilgerson stond garant voor de "Teeth", ze ging in op het gebruik van gebitselementen voor de bepaling van het geslacht. Peter de Knijff van het Forensisch Laboratorium voor DNA onderzoek van het Leids Universitair Medisch Centrum gaf een zeer illustratieve lezing met als titel "Unravelling man's history using DNA of the living?". Naast klassiek fysisch antropologisch onderzoek zoals dat van Femke

Rijpma, die inging op het leven van de begijnen van Breda, wist Tjasse Bruintjes ons te boeien met gedetailleerde anatomische overwegingen over de vorm van de neus. Zelf heb ik een verhaal gehouden over veldwerk op Oost Java van afgelopen september, een samenwerkingsproject tussen Naturalis en het Geologisch Museum in Bandung.

De dag was fraai omlijst met vertegenwoordigers van beide organiserende partijen. John de Vos van Naturalis opende de dag, wijzend op de verbindende link die de *Pithecanthropus* fossielen vormen tussen de natuur en de mens. De voorzitter van de Nederlandse Vereniging voor Fysische Antropologie, Machteld Roede, had het laatste woord. Als bioloog is Machteld ooit overgestapt van onderzoek naar de groei bij vissen naar groeiprocessen bij de mens. Een stap die we metaforisch gezien vaker zouden moeten maken. De mens is immers onlosmakelijk verbonden met de natuur, wij maken net zoveel deel uit van de biosfeer als iedere willekeurige walvis uit de Noordzee of vlinder uit het tropisch regenwoud van Afrika. Biologisch gezien functioneren we in principe op dezelfde wijze. Het idee biologische aspecten van de mens te presenteren en te bediscussiëren in het centrum van biodiversiteit sprak mij enorm aan. Kortom, volgens mij was het een zeer geslaagde dag.

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**Abstracts**

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Abstract article published in the American Journal of Hematology (2003) 74: 99-103

**THE MOLECULAR SPECTRUM OF  $\alpha$ -THALASSEMIA IN THE IRANIAN POPULATION OF HORMOZGAN; THREE NOVEL POINT MUTATION DEFECTS**

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<sup>3</sup>Hemoglobinopathies Group, Laboratory of Hematology, Pasteur Institute of Tunis, 1002 Tunis le Belvedere, Tunisia.

We describe the molecular spectrum of  $\alpha$ -thalassemia mutations in a population sample of newborns in the South-Iranian province of Hormozgan. Out of 660 randomly collected blood samples 218 (33%) had visibly elevated Hb-Bart's. DNA was extracted from 78 samples out of this selection (n=156), of which 114 alleles were found to carry an  $\alpha$ -thalassemia defect. Besides the common  $-\alpha^{3.7}$  (79.1%),  $-\alpha^{4.2}$  (1.7%) and  $\alpha^{-5nt}$   $\alpha$  alleles (4.3%), three novel non-deletional  $\alpha$ -thalassemia mutations were found; the  $\alpha_2$ cd19 (-G) frameshift mutation (12.2%), the  $\alpha_1$  IVS1-148(A>G) (0.9%) affecting the splice acceptor site consensus sequence and the cd14 (TGG>TAG) (0.9%), which creates a premature stop codon in the first exon of the  $\alpha_1$ -gene. A fourth mutation in the  $\alpha_1$ -gene, the IVS1-38 (C>T) (0.9%) of undetermined effect, was found in an individual heterozygous for the  $\alpha_2$ cd19(-G) mutation.



Article as published in The British Journal of Haematology (2003) 120: 364-366

**A NOVEL 7.9 KB BDELETION CAUSING  $\alpha^+$ -THALASSAEMIA IN TWO INDEPENDENT FAMILIES OF INDIAN ORIGIN**

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<sup>1</sup>Department of Human and Clinical Genetics, Leiden University Medical Center, The Netherlands.

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### Summary

$\alpha$ -Thalassaemia is most frequently the result of deletions involving one or both  $\alpha$ -globin genes on the short arm of chromosome 16. These deletions involve homologous or non-homologous recombinations based upon the presence or absence, respectively, of homology between parental sequences at the site of recombination. One of the most common mechanisms leading to  $\alpha^+$ -thalassaemia involves misalignment between the two highly homologous 4-kb duplicated units in which the  $\alpha$ -globin genes are embedded. Crossing-over between the misaligned homology boxes (X, Y and Z) gives rise to the frequently occurring  $-\alpha^{3.7}$  (Rightward) and  $-\alpha^{4.2}$  (Leftward) deletion. However, several other  $\alpha^+$ -thalassaemia determinants have been described for which the mechanisms are either still unknown or involve a non-homologous recombination event.

We describe the characterization of a novel 7.9 kb deletion taking away one of the duplicated  $\alpha$ -globin genes and causing an  $\alpha^+$ -thalassaemia phenotype in two independent carriers of Suriname-Indian origin. The molecular characterization of the deletion breakpoint fragment revealed neither involvement of Alu-repeat sequences nor the presence of homologous regions prone to recombination, suggesting a non-homologous recombination event. This  $\alpha^+$ -thalassaemia deletion was found to give rise to an atypical HbH-disease characterized by a non-transfusion dependent moderate microcytic hypochromic anemia in combination with a poly-adenylation signal mutation of the  $\alpha$ -globin gene ( $\alpha_2$  AATAAA $\rightarrow$ AATA--).



Abstract of a short report published in The British Journal of Haematology (2003): 122, 855-858:

### **NOVEL 112 KB ( $\epsilon^G\gamma^A$ ) $\delta\beta$ -THALASSAEMIA DELETION IN A DUTCH FAMILY**

Cornelis L. Harteveld<sup>1</sup>, Cameron S. Osborne<sup>2</sup>, Marjolein Peters<sup>3</sup>, Steffie van der Werf<sup>1</sup>, Rob Plug<sup>1</sup>, Peter Fraser<sup>2</sup> and Piero C. Giordano<sup>1</sup>

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An adult autochthonous Dutch patient who had exhibited severe perinatal anaemia, with partial recovery a few months after birth, was studied for the presence of  $\beta$ -thalassaemia. Southern blot showed the patient to be hemizygous for a novel deletion in the  $\beta$ -globin gene cluster leaving the  $\beta$ -gene intact. Inverse PCR was used to determine the breakpoint sequence. The deletion was found to remove 112 kb starting upstream of the HOR5'b6 gene to the second intron of the  $\gamma^A$ -globin gene, including the Locus Control Region. The breakpoint fragment revealed the presence of a 13 bp orphan sequence not present at either side of the breakpoint.



Abstract article presented to Hemoglobin (2003)

### **A NEW Hb EVANSTON ALLELE [ $\alpha$ 14(A12)Trp->Arg] FOUND SOLELY, AND IN THE PRESENCE OF COMMON $\alpha$ -THALASSEMIA DELETIONS, IN THREE INDEPENDENT ASIAN CASES**

Cornelis L. Harteveld<sup>1</sup>, Pierre W. Wijermans<sup>2</sup>, Juliette E.L.M. de Ree<sup>3</sup>, Pauline Ter Hal<sup>1</sup>, Peter Van Delft<sup>1</sup>, Irene H. Van Rooijen-Nijdam<sup>4</sup>, Ellen Rasp<sup>2</sup>, Peter J.M.J. Kok<sup>4</sup>, John H.M. Souverijn<sup>5</sup>, Florens G.A. Versteegh<sup>3</sup>, and Piero C. Giordano<sup>1</sup>

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<sup>5</sup> Central General Practitioners Laboratory (Stichting Centraal Artsen Laboratorium), Leiden, The Netherlands

Hb Evanston [ $\alpha$ 14(A12)Trp $\rightleftharpoons$ Arg] is considered to be a rare  $\alpha$  chain mutant, and was originally observed in two Black families in 1982, inducing a mild Hb H disease phenotype in a homozygous state for the  $-\alpha^{3.7}$  deletion ( $-\alpha^{\text{Evanston}}/-\alpha$ ). The mutant, evidently linked with one of the two  $-\alpha^{3.7}$  thalassemia (thal) alleles, was considered to be unstable and rapidly proteolyzed. We describe Hb Evanston in three new independent Asian cases, all induced by a TGG to CGG transition. In all cases the mutation is linked to the  $\alpha$ 1-globin gene, either on a wild type allele or in linkage with the common  $-\alpha^{3.7}$  and  $-\alpha^{4.2}$  deletion alleles. The  $\beta/\alpha$  ratio was balanced in the presence of the mutation only, and accordingly unbalanced in co-inheritance with the deletion defects. Although a second independent mutation event on a  $-\alpha^{3.7}$  or a  $-\alpha^{4.2}$  deletion allele could not be excluded, we conclude that at least one independent Hb Evanston mutation has occurred on a wild type allele in the Asian populations. Unstable Hb tetramers tend to degrade and disappear during purification. Both Hb Evanston tetramers, formed in combination with normal  $\beta$  and  $\delta$  chains, remain perfectly stable after extensive purification and concentration steps, suggesting an early posttranslational thalassemic effect, probably at the dimer/tetramer affinity level.



Presented to Hemoglobin 2003 as short communication:

**$\alpha$ -THALASSEMIA PHENOTYPE IN A DUTCH HINDUSTANI CAUSED BY A NEW POINT MUTATION CREATING AN ALTERNATIVE SPLICE DONOR SITE IN THE FIRST EXON OF THE  $\alpha_2$ -GLOBIN GENE**

C.L. Harteveld<sup>1</sup>, P.W. Wijermans<sup>2</sup>, P. van Delft<sup>1</sup>, E. Rasp<sup>2</sup>, H.L. Haak<sup>2</sup> and P.C. Giordano<sup>1</sup>

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The  $\alpha$ -thalassemias are genetic defects characterized by the decrease or complete suppression of  $\alpha$ -globin polypeptide chains. Most  $\alpha$ -thalassemia determinants are

deletions involving one or both of the duplicated  $\alpha$ -globin genes, even though an increasing number of point mutations has been described. Four mutations affecting the splice site consensus sequence of the  $\alpha$ -globin genes are known to date. These involve two splice acceptor site mutations at  $\alpha_2$ IVS 1-116 and  $\alpha_1$ IVS1-117 and two splice donor site mutations of the  $\alpha_2$ - and  $\alpha_1$ -globin gene, respectively the penta-nucleotide deletion and the IVS1-1 (G→A). The last two mutations eliminate splicing from the wild type donor site, but activate a cryptic splice site in the middle of exon 1 in vitro. We describe the characterization of an  $\alpha^+$ -thalassemia determinant due to a transition of C→T at codon 22 of the  $\alpha_2$ -globin gene creating an alternative splice donor consensus sequence. The mutation was found in a woman of Surinamese Hindustani origin living in The Netherlands. The abnormally spliced mRNA product from the  $\alpha_2$ -gene carrying the mutation doesn't lead to functional protein and causes a mild  $\alpha^+$ -thalassemia.



Abstract of an article published in Ned. Tijdschr. Geneeskd 146(31), 1441-1443, August 2002

### **SHORT PREGNANCY INTERVAL AND REPRODUCTIVE DISORDERS**

P.H. Jongbloet, G.A. Zielhuis and P.C.M. Pasker-de Jong

The cause of the 'borderline personality disorder' of Vincent van Gogh has been discussed in social-psychiatric terms related to so-called 'substitute children', born after the loss of a previous child. A biological-organic genesis, i.e. the very short birth interval of precisely one year between Van Gogh and his older brother appears to be a more plausible explanation.

Personality disorders, which are part of the spectrum of schizophrenic disorders, seem to belong to the very broad 'continuum of reproductive casualties' and to be caused by non-optimal maturation of the oocyte during the postpartum restoration of the ovulatory pattern.

This continuum occurs during each of the transitional stages of reproductive life in which the maturation of the oocyte is constrained and consists of chromosomal aberrations, (discordant) monozygotic twins, early and late foetal death, preterm births, intrauterine growth retardation, congenital abnormalities, perinatal and neonatal mortality, cot death, growth and mental defects, and finally, chronic or 'constitutional' diseases.

Non-optimal maturation of the oocyte appears to be a risk factor for the reproductive casualties stated.



Abstract of an article published in Environmental Health Perspectives 110(1), 1-3, January 2002

### **WHERE THE BOYS AREN'T: DIOXIN AND THE SEX RATIO**

Piet Hein Jongbloet, Nel Roeleveld, and Hans M.M. Groenewoud  
Department of Epidemiology and Biostatistics, University Medical Centre, Nijmegen

The question of how exposure to dioxins might affect only males and why it affects preferentially male embryos in the Seveso data presented by Mocarelli et al. remains intriguing. This enigma can be explained by the ovopathy concept, which addresses the determination of both the sex and the condition of the progeny. Antiandrogenic properties of dioxin alter the sperm-transit time and mating behavior, which provoke delay of fertilization of the oocyte (postovulatory overripeness of the oocyte). Antiestrogenic properties of dioxin during mid-cycle compromise both mucus liquefaction and maturation of the oocyte (preovulatory overripeness ovopathy). A positive dose-response of male-biased pathologic conceptuses is often followed by a negative one due to "vanishing male conceptuses." This dose-response fallacy is present in animal experiments and explains many otherwise unexplained phenomena related to dioxin contamination and other high-risk conceptions.



Abstract of an article published in Environmental Health Perspectives 1009(7), 749-752, July 2001

## **THE SECULAR TRENDS IN MALE:FEMALE RATIO AT BIRTH IN POSTWAR INDUSTRIALIZED COUNTRIES**

Piet Hein Jongbloet, Gerhard A. Zielhuis, Hans M.M. Groenewoud, and Pieterneel C.M. Pasker-deJong

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Finnish investigators [Vartiainen et al. Environmental Chemicals and Changes in Sex Ratio: Analysis Over 250 Years in Finland. *Environ Health Perspect* 107:813-815 (1999)] presented the sex ratio of all newborn babies from 1751 to 1997 in order to evaluate whether Finnish long-term data are compatible with the hypothesis that the decrease in the ratio of male to female births after World War I and World War II in industrial countries is caused by environmental factors. They found an increase in the proportion of males from 1751 to 1920, which was interrupted by peaks in male births during World War I and World War II and followed by a decrease thereafter, similar to the trends in many other countries. The turning point of male proportion, however, preceded the period of industrialization and introduction of pesticides and hormonal drugs. Thus, a causal association between these environmental exposures and this decrease is unlikely. In addition, none of the various family parameters (e.g., paternal age, maternal age, age difference in parents, birth control) could explain the historical time trends. Vartiainen et al. concluded that at present it is unknown how these historical trends could be mediated. The postwar secular decline of the male:female ratio at birth is not an isolated phenomenon and parallels the decline of perinatal morbidity and mortality, congenital anomalies, and various constitutional diseases. This parallelism indicates a common etiology and may be caused by reduction of conceptopathology, as a correlate to increasing socioeconomic development. An inverted dose response or the dose-response fallacy due to vanishing male conceptuses explains the low sex ratios before World War I and World War II in newborns from black parents and from the lowest socioeconomic classes.



## **MALE STATURE. A PARAMETER OF HEALTH AND WEALTH IN THE LOW COUNTRIES, 50-1997 AD**

G.J.R. Maat

In: Wealth, health and human remains in archaeology. 25th Kroon-lecture, (Metz, W.H., ed.). Foundation for Anthropology and Prehistory in The Netherlands, Amsterdam, 57-88, 2003.

This paper offers a review, with additional data for the turn of the 20th century, of shifts in average male stature and their relationship with health and wealth in the Low Countries from 50 to 1997 AD. Twenty-one population samples were studied to cover the full time span. Data used were 'virtual statures', i.e. the statures which adult males are supposed to have had at the end of their growth period before they started shrinking by aging. They originated from 'in situ (in the grave) measured statures', 'calculated statures' and 'corrected cadaveric statures'. All conformed to adjusted definitions to make them compatible. If possible, maximum femoral lengths were also collected from the same population samples to check if trends in stature development harmonized with raw skeletal data. In general, maximum femoral lengths confirmed results on stature trends. A long phase of stature decrease from c. 176 cm to 166 cm, a so-called 'negative secular trend', was noticed from the Roman Period up to and including the first half of the 19th century. This was abruptly followed by a sharp and still ongoing increase in stature to 184 cm, a typical 'positive secular trend', from the second half of the 19th century to the present time. Causes underlying these dramatic changes and exceptions illustrative for the process are explained in the context of socio-economic, demographic, health and nutritional factors.



## **THE HEALTH STATUS OF OUR ANCESTORS. THE ARCHAEOLOGICAL SKELETON AN ARCHIVE OF FAILURES AND SUCCESSES**

G.J.R. Maat

Nehalennia 140: 23-26, 2003.

No abstract



## **AGE PREDICTION FROM BONE REPLACEMENT. REMODELLING OF CIRCUMFERENTIAL LAMELLAR BONE TISSUE IN THE ANTERIOR CORTEX OF THE FEMORAL SHAFT OF THE PRESENT DUTCH POPULATION**

G.J.R Maat, M.J. Aarents and N.J.D. Nagelkerke

Leiden, Barge's Anthropologica 10: 1-44, 2003 (ISBN nr.90-806456-7-2)

In order to have a simple and little invasive age at death determination method, the known microscopic method based on the replacement of bone tissue with increasing age was adapted to Dutch (West European) demands. In transverse sections of the anterior shaft of the femur, the relative decrease in surface area occupied by non-remodeled circumferential lamellar cortical bone together with its enclosed non-Haversian canals was tested as a parameter for passed life time of individuals. To achieve the best possible accuracy and applicability, a collection of samples from the anterior cortex of the femoral midshaft of 86 males and 79 females, ranging in age from 1 to 96 years of age, was assembled. Detailed instructions were drafted for the preparation of materials and equipment in order to determine the percentage of non-remodeled surface in the subperiosteal area by means of a one square millimeter counting framework of 10 x 10 squares. The framework was projected via a regular drawing attachment into a light microscope with polarization filters. To cover the remodeling process in the entire anterior cortex of a microscopic transverse section, quantitative assessments were done at the most anterior point of the femur shaft and at a point 25° to the left and to the right. Dependence of predicted age on subperiosteal bone replacement in the *entire anterior cortex* of the femur for males and females combined, appeared to be very significant ( $p < .001$ ). Seventy-eight percent of the variance in predicted age was explained by the covariable percentage of non-remodeled bone. Differences between males and females were negligible and statistically not significant ( $p = .622$ ). In contrast to the dependence of age on bone replacement in the *most anterior part* of the femur only, the dependence in the *antero-lateral parts* was even slightly higher than for the *entire anterior cortex*. Contrary to body frame, dependence of age on cadaveric length for males and females combined was statistically very significant. The latter finding corresponded well with the present strong secular trend in growth in the Netherlands. In addition to regression equations extracted from the quantitative analyses, a series of characteristic micrographs of human transverse sections through the midshaft of the anterior femur was selected to meet demands for qualitative assessments of age. General views and close-ups exposed to polarized and bright light were prepared for every 10-year age interval, young growing individuals included.



**THE MUMMY FROM ZWOLLE. THE X-RAY, CARBON-ISOTOPE AND  
DNA-ANALYSIS (DE ZWOLSE MUMMIE. HET RÖNTGEN-,  
KOOLSTOFISOTOPEN- EN DNA-ONDERZOEK)**

G.J.R. Maat, A.M.C. Wittert van Hoogland, Kl. van der Borg and P. de Knijff

In: The mummy from Zwolle unravelled (Van Dijk, L., Korendijk, B., Maat, G.J.R. and  
Needham, C. eds), 20-25, Municipal Museum of Zwolle, Zwolle, 2003

(no abstract)



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Publications

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Letter to the Editor of International Epidemiological Association 2003, 32: 878-879

**IS THE MEDITERRANEAN DIET RELEVANT TO MYOCARDIAL INFARCTION? OLIVE OIL CONSUMPTION VERSUS GEOGRAPHICAL LATITUDE**

Piet Hein Jongbloet

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The discussion between Bertuzzi et al. and Fernández Jarne et al. concerning non-fatal myocardial infarction (AMI) and olive oil consumption in Italy and Spain highlighted the controversy. In three of the four Mediterranean case-control studies, two in Italy and one in Greece, any support for a strong inverse relation between olive oil and coronary heart disease (CHD) was lacking; in contrast, an inverse association was reported in Spain. This inverse association has been put in the public domain and both research groups agree that this association remains open to discussion.

People who eat large quantities of saturated fat, in the form of butter, cheese, and other milk products, often have one of the lowest rates of cardiovascular disease and too many disturbing paradoxes, such as the so-called French, Italian and Albanian paradoxes, remain vexatious and provocative. Life in Mediterranean countries might be protective, but the time has come for a major paradigm shift of ecological difference in health outcomes: not 'the olive', i.e. the lifestyle and behaviour might be essential in the causation of cardiovascular heart diseases (CVD), but the *geographical location*, i.e. 'where the olive grows'. A geographical South-to-North gradient in the prevalence of CHD within countries demands attention, e.g. in Great Britain and France, and on a still more intricate scale, among countries at different latitudes, such as Italy, The Netherlands and Finland, or France versus Northern Ireland.

A similar geographical gradient has been established in many constitutional diseases and very different countries, e.g. schizophrenia, suicide, and prostate, breast, and other cancers. This latitude effect in incidence increases away from the Equator, not only in the Northern hemisphere, but also in the Southern hemisphere, as for example, in fatal neural tube defects and diabetes type 1. All these conditions are characterized not only by this latitude effect, but also by *seasonality of birth*. This connection reveals an interesting causal relationship between these conditions and the ovulatory pattern, and

in particular to pathological conceptions.

The consistent and predictable relations between the South-to-North gradient and timing of mating seasons in cats, non-human and human primate populations indicates seasonality of the ovulatory rate. The so-called seasonally pre-ovulatory overripeness ovopathy (SPrOO-) hypothesis states that optimal or high-quality oocytes coincide with the peaks of this ovulatory pattern, the less-optimal and poor quality ones appearing in the transitional stages between the ovulatory seasons. The (patho-)physiological processes of oocyte maturation in animals and the circumstantial evidence of similar phenomena in humans explain these seasonally bound coincidences. The further from the Equator, the stronger the seasonality of the ovulatory pattern and the higher the rate of non-optimal conceptions. Geographical latitude and its intricate relation to seasonality of birth reveals new mechanisms and disease pathways and, in addition, the ability to explain social, geographical, and temporal patterns of disease distribution.



Letter to the Editor of Human Reprod. 2003, 18(11): 2491-2492

### **THE MALE DISADVANTAGE AND THE SEASONAL RHYTHM OF SEX RATIO AT THE TIME OF CONCEPTION**

P.H. Jongbloet

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The conclusion of Cagnacci et al. (2003) that more males than females are conceived in seasons with more favourable reproductive conditions challenges the well-known V-shaped probability of delivering more male offspring at both the onset and the end of the fertile window, versus equal gender proportions at the time of ovulation in the mid-cycle (Guerrero, 1974; Harlap, 1979, James, 1996). It even seems opposite to the general experience of increasing sex ratio (SR) at younger and advanced maternal age in animals, versus the approach to equity during 'prime productive age', independent of birth order and paternal age (King and Stotsenburg, 1915; Clutton-Brock and Jason, 1986; Kojola and Eloranta, 1989). The former conditions are characterized by an irregular ovulation rate, the latter by a regular one. Still more worrying is the other general tendency in amphibians, birds and mammals of rather equal numbers of male and female births when mating occurs at the peak(s) of seasonally bound heat periods,

versus high SR at the breakthrough and breakdown of the ovulatory pattern (Heape, 1908; King and Stotsenburg, 1915; Wolda, 1935; Coulson and Hickling, 1961; Stirling, 1971; Lambin, 1994). The peaks of reproductive performance appear to go hand in hand with more optimal progency; the transitional stages with more disabled progency. The conclusion of Cagnacci et al. is incompatible with these general experiences, and therefore embarrassing for any researcher into modulation of the SR. The overripeness ovopathy concept (Jongbloet et al, 1996, 2001, 2002) might reconcile the present controversy. At the mid-cycle, optimal maturation of the oocyte and optimal liquefaction of the cervical mucus are modulated by the estrogens, which promotes equity of male and female conceptuses. In contrast, non-optimal maturation of the oocyte or pre-ovulatory overripeness ovopathy (PrOO) entails impossibility of fertilization, defective implantation, transitory retardation in the rate of development, and a wide spectrum of anomalies in organogenesis and in differentiation of various tissues and organ systems, as evidenced after experimental delay of the ovulation in animals (Mikamo, 1968; Butcher, 1981). Y-Bearing sperm are smaller than X-bearing ones (Cui, 1997) and their fertilization capacity will therefore be advantaged in the case of non-optimal liquefaction of the cervical mucus. Preferential fertilization of aged oocytes by Y-bearing sperm thus induces an excess of male-biased (non-optimal) embryos and loss of them before implantation or birth. In extreme circumstances, accumulation of the rate of ovopathy will result in a reversal of the SR after having surpassed a certain threshold, i.e. again a decrease of the SR.

The interesting data of Cagnacci et al., and particularly their 'theoretical phases in their periodogram', do not perhaps represent what they seem to. Instead of comparing these curves in their Figure, one can follow the SR per month corresponding to the conception rate. This reveals a double hump surge: the SR appears to increase in May during the rise of the conception rate (corresponding to the breakthrough of the ovulation rate), to decrease in June/July at the peak (corresponding to optimal ovulation rate), again to increase in August/September during the descent of the conception rate (corresponding with the breakdown of the ovulation rate) and finally to become inverted in the feminine direction from December to April (corresponding with the season of a more constrained ovulation rate).

Lower SR at the zenith of the seasonally bound birth peaks and, in contrast, more male births at the transitional stages have not only been recorded in animals, as mentioned already, but also in naturally conceiving populations (van Eyk, 1904; Heape, 1909; Wolda, 1927; Huntingdon, 1938a; Underwood, 1995). Similar configurations were always present in contemporary populations from the Netherlands, Germany and the USA, or from Australia in the Southern hemisphere (Jongbloet et al, 1996).

The seasonal birth (or conception) peaks concur not only with this equity trend in the

SR, but also with optimal weight and length at birth, at school age and even at adulthood (Noack and Otto, 1957; Henneberg and Louw, 1993; Matsuda et al., 1995; Weber, 1998; Banegas et al., 2001), with brightness (Huntingdon, 1938b) and longevity (Jongbloet, 1992; Doblhammer and Vaupel, 2001). This is opposed to the conclusion of Cagnacci et al., but in line with superior developmental competence of the related oocytes; pathological progency and male excesses always concur with the slopes of these birth peaks in line with constrained developmental competence of the oocytes.

All these phenomena persuade us to adjust the conclusion of Cagnacci et al.: at the peaks of the seasonally bound ovulatory rate there is a tendency to equity in the sex distribution (and to optimal conceptuses); at the breakthrough and breakdown, more males than females are conceived (and less optimal conceptuses); and, in the most constrained conditions, the SR becomes inverted due to excessive loss of male-biased (pathological) fetuses.



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### Forthcoming events

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#### Forthcoming events

Biomolecular Archaeology Symposium  
Vrije Universiteit, Amsterdam  
March 18-20, 2004

26ste Kroon Voordracht  
KNAW, Amsterdam  
Professor Miranda Aldhouse-Green  
(University of Wales College, Newport, Wales)  
Beyond the Gods: Biographies, Values and Cosmologies in 'Celtic' Iconography  
April 2, 2004

International Conference on Legal Medicine and Forensic Sciences  
8th Cross Channel Conference  
Brugge Belgium  
April 20-24, 2004  
katia.vyncke@chemiphar.com and/or <http://membres.lycos.fr/coc2004/>

Barge Forum  
Anatomy Building, Leiden  
"Oorafdrukken"  
C. van der Lugt (Recherche School , Zutphen)  
Lynn Meijerman (Barge's Anthropologica)  
July 3, 2004

Paleopathology Association  
15th Paleopathology Association Meeting  
University of Durham, England  
August 11-15, 2004  
ppa2004.conference@durham.ac.uk

European Anthropological Association  
14th Congress of the E.A.A. on Human Variability  
Komotini, Greece

January 2004

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September 1-5, 2004

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