

ANTHROPOLOGICAL ANALYSIS OF HUMAN SKELETAL REMAINS FROM A MODERN CEMETERY IN WYSZYŃSKI STREET IN WROCŁAW, POLAND

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Introduction

Wrocław is a town, with rich, long history and tradition. The city was founded in the tenth century, but there is evidence of the presence of Silesian settlements even from ninth century. Now Wrocław is the capital of Lower Silesia. The historians consider ancient settlement Budorigum as a predecessor of Wrocław, which is known from Claudius Ptolemy's maps from years 142-147 A. D. Wrocław was founded by Czech duke Wratisława (reign in years 915-921). The name of the town is derived from Wratislaw's son- Wrocisław (Fig. 1).

Nowadays, Wrocław is one of the biggest towns in Poland, and has a variety of ethnical and cultural traditions.



Figure 1: Medieval Wrocław (XV century).

The aims

This paper is about human skeletal remains from a cemetery from Wyszyński Street in Wrocław. The goal is morphological analysis, living and health conditions estimation. Analysis includes metrical characteristics of male and female skulls and postcranial skeletons, analysis of non-metrical skull and postcranial characteristics, computation of skull capacity, the adult live height and assessment of health. The assessment of health and living conditions has been based on physiological stress indicators such as *cribra orbitalia*, enamel hypoplasia and caries. Analysis concerns also pathological lesions.

Material

The anthropological excavations started on June 2003, just before the beginning of construction of the Main Library of Wrocław University. The first coffin was found on the depth of 1,5 meters underground.

The excavations which are being described are situated near so-called Ostrow Tumski. This is the oldest part of town, which has a lot of historical monuments. The cemetery is connected with St. Aegidius Church, which descends from XIII century.

The excavations were run till October 2003. There were excavated 328 graves, but number of skeletons was 326, because of 4 doubly graves and 5 with double numeration (Limisiewicz et al. 2003; Dąbrowski et al. 2003). The graves were situated from 114.70 to 116.32 m above sea level.

Most of skeletons were badly (fragmentary) preserved (76.7 %), and percentage of good and quite good preserved skeletons were only 11.0 % (Table 1).

Most coffins were rectangular (30.7%), or trapezoid (16.0%). There were 16% of destructed and impossible to determine graves.

The cemetery was set on humid area, which was often flooded, so the bones and the coffins were always wet. What is more, the XIX- the century buildings situated near to the Odra River caused additional damages (Table 1; Limisiewicz et al. 2003).

Table 1. Preservation conditions (Limisiewicz et al. 2003).

Preservation condition	Number of cases	%
Very good	1	0.3
Quite good	18	5.5
good	18	5.5
Fragmentary	250	76.7
Bad	7	2.1
Illegible	32	9.8
Raze	326	1

Most of the skeletons (65.6%) were buried with head directed on west. In 79 cases there were problems with define of skull direction.

One hypothesis says that on this cemetery the victims of various epidemics, which affected the city in 1055-1484, were buried. The most important epidemics were in: 1298, 1348, 1356, 1360, 1362, 1372, 1413, 1438, 1451-1452, 1460, 1464, 1484, 1496. The most serious epidemics was in 1348 year, when half of population died of plague (Gilewska- Dubis 2000; Table 2).

Table 2. Number of residence and number of houses in Wroclaw in years1403-1741 (Buško et al. 2001).

Years	Number of residents	Increase %	Number of houses	Increase %
1403	19197	100	2272	100
1470	18945	98,7	2320	0
1579	29327	152,8	2478	102,1
1591-1613	32430	168,9	3400	109,1
1619	36260	188,9	0	146,6
1640	20000	104,2	0	0
1675	30000	156,3	0	0
1710	41000	213,6	0	0
1741	48000	250	0	0

Unusually, there was no church in the area of cemetery, as it was normally in the medieval cemeteries in Wroclaw. The cemetery doesn't exist in any historical plans of the city (Limisiewicz and all 2003; Fig. 2).

The 98 skeletons had been selected for further conservation and analysis, and stored in Department of Anthropology on the Wroclaw University.

Sex was described in 60.2 %. 22 skeletons are male, and 37- female. In 39 cases sex wasn't estimated (Table 3).

10 of the skeletons of undetermined sex were children (*infant I* to *juvenis*), and 11 were adults. Sex and age were undetermined for 18 skeletons (Tab. 4).

Age was determined for 80 skeletons. Among male skeletons, only 22.4 % skeletons have determined age. The most of them are *adultus* (20-35 years) - 9 skeletons (9.2 %) and *maturus* (35-50 years) - 8 skeletons (8.2 %).

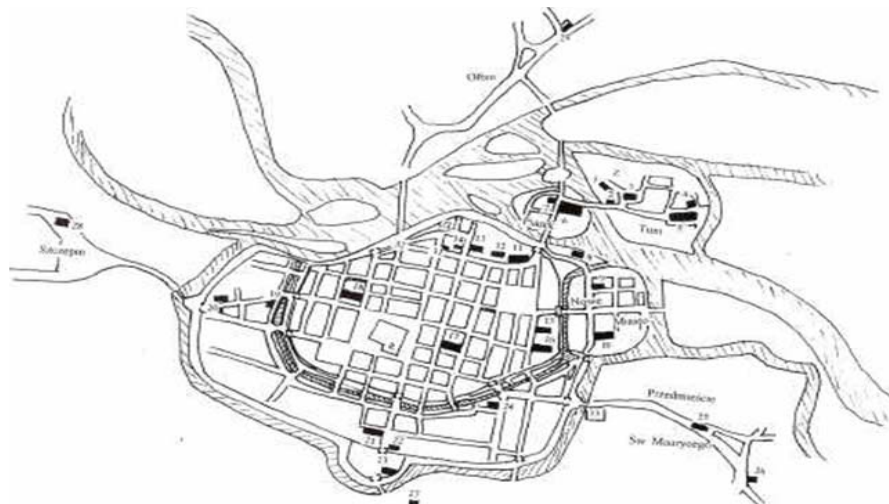
Female skeletons were mainly *adultus* (20-35 years) - 20 skeletons (20.4 %) and *maturus* (35-50 years) - 12 skeletons (12.2 %).

There was found only one skeleton of *senilis*, which was female. "

Children's skeletons were mainly in class *infans I* (0-7 years) - 3 skeletons (3.1 %) and *juvenis*- 5 skeletons (5.1 %; Table 4).

Among material, 80 skeletons have skull but in 64 cases the skulls were fragmentary (80.0%). Among the others (20.0%) 6 were *calotta* (37.5%) and *cranium* and *calvaria* (adequate - 3 skulls) each 18.8%, *calvarium* (2 skulls, 12.5%) and *calvaria* (1 skull) and *calotta* with jaw- bone (1 skull). Sex was possible to estimate in 56 skeletons, 19 of them was males (23.7%) and 37 was females (46.2%; Table 5).

The differences in appearance of physiological stress indicators between sexes (such as *cribra orbitalia*, enamel hypoplasia and caries) were analyzed by chi-square test.



- | | |
|---------------------------------------|--|
| 1 – St. Marcin's Church; | 18 – St. Elżbieta's Church; |
| 2 – St. Piotr and Paweł's Church; | 19 – Bożego Grobu's Church; |
| 3 – St. Krzyża's Church; | 20 – St. Barbara's Church; |
| 4 – St. Idzi's Church; | 21 – St. Doroty Church; |
| 5 – St. Jan's cathedral; | 22 – St. Hieronim's Church; |
| 6 – NPM's church | 23 – Bożego Ciała's church; |
| 7 – St. Anna's church | 24 – St. Maria Egipcjanka's Church; |
| 8 – St. Duch's Church | 25 – St. Maurycy's Church; |
| 9 – St. Klemens's Church; | 26 – St. Łazarz's Church; |
| 10 – St. Bernardyn's Church; | 27 – St. Gertruda's Church |
| 11 – St. Jakub's Church; | 28 – St. Mikołaja's church |
| 12 – St. Klara's Church; | 29 – Jedenastu Tysięcy Dziewic's Church |
| 13 – St. Maciej's Church | 30 – St. Wincent's Church |
| 14 – St. Jerzy and Agnieszka's Church | 31 – Old Synagogue |
| 15 – St. Katarzyna's Church; | 32 – New Synagogue |
| 16 – St. wojciech's Church | 33 – Jewish Cemetery (Buśko et al. 2001) |
| 17 – St. Maria Magdalena's Church | |

Figure 2: The sacral topography of Wrocław.

Table 3. Sex proportion.

Sex	Number	%
Male	22	22.4
Female	37	37.8
Undetermined	39	39.8
All	98	100.0

Table 4. Skeletal's age and sex.

Age	Male	%	Female	%	Undetermined sex	%	Σ	%
Infans I	0	-	0	-	3	3,1	3	3,1
Infans I/ II	0	-	0	-	2	2,0	2	2,0
Infans II	0	-	0	-	2	2,0	2	2,0
Juvenis	0	-	2	2,0	3	3,1	5	5,1
Juvenis/ adultus	0	-	1	1,0	0	-	1	1,0
Adultus	9	9,2	20	20,4	11	11,2	40	40,8
Adultus/ maturus	5	5,1	1	1,0	0	-	6	6,1
Maturus	8	8,2	12	12,2	0	-	20	20,4
Maturus/ senilis	0	-	0	-	0	-	0	-
Senilis	0	-	1	1,0	0	-	1	1,0
	0	-	0	-	18	18,4	18	18,4
Σ	22	22,4	37	37,8	39	39,8	98	100,0

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Table 5. Preservation conditions.

Skull's condition	Male	%	Female	%	Undetermined sex	%	Σ	%
cranium	-		1	1.2	2	2.5	3	3.8
calvarium	-	-	1	1.2	1	1.2	2	2.5
calvaria	-	-	1	1.2	2	2.5	3	3.8
Calvaria (m)	-	-	1	1.2	-	-	1	1.2
calotta	-	-	6	7.5	-	-	6	7.5
Calotta (m)	1	1.2	-	-	-	-	1	1.2
Fragmentary	18	22.5	27	33.7	19	23.8	64	80.0
Σ	19	23.7	37	46.2	24	30.0	80	100.0

Methods

Sex was estimated by often used in anthropology methods, like morphological differences, e.g.:

- skull morphology,
- s pubic bone morphology and pubic arcus
- s bone size

Age was estimated by:

- obliteration of skull sutures
- degenerative changes in bones, especially in spine
- dental changes (Acsádi, Nemeskéri 1970; Piontek 1999).

Pathological lesion of bones were also described.. I have used classification of the pathological diseases suggested by Gladkowska- Rzeczycka:

- I: development changes; II: injuries; III: infections diseases (specific and non- specific);
- IV: degenerative changes; V: Metabolic diseases; VI: endocrine diseases; VII: tumors.

Analysis

1) *Morphological analysis*

A) *Non- relative and relative feature of skull*

Unfortunately, the condition of those skeletal series caused that it was possible to analyze only few individuals. Only one male skull was measured. That skull is *hyperbrachykranium* and *stenometopus*. The biggest value for estimation had the chord- arch occipital plain coefficient (96.0), which shows that skull in that part is the least vaulted. The most vaulted is frontal bone.

Female's skulls also were *hyperbrachykranium*, but in contradistinction to male's skulls, they were *metrinometopus*. The biggest value had the chord- arch occipital squama - coefficient.

The calculation of skull capacity was possible only in 4 cases (2 females, 1 probably male, 1 probably female). I - used Lee Pearson's and Manouvrier's methods (Table 6).

Table 6. Skull capacity.

Skull's number	Sex	Lee Pearson	Manouvrier	Broc's classification	Turner's classification	Sergi's classification	Difference in methods
130/ 6	female	1259, 9	1329, 4	small	mikrokefalic	alatokef or digikef	69, 5
43/3	female	1253, 1	1246, 7	small	mikrokefalic	alatokef	6, 4
85/4	Unsure female	1235, 2	1255, 8	Small	mikrokefalic	alatokef	20, 6
64/3	Unsure male	1251, 3	1410, 3	Small	mikrokefalic or mesokefalic	alatokef or metrokef	159, 0

B) *Skull non- metric characteristic*

I have used the most of best conditioned 16 skulls. I described them, without sex classification, because connection between non- metric features of the skull and sex and age isn't significant (Kellock, Parsons 1970; Ossenber 1976; Kwiatkowska 2005; Tb.7).

The most frequent non- metric features were (from p=0.300 to p=0.650):

- foramen parietale
- incisura frontalis accesoria seu foramen frontalne accesorium
- foramen supraorbitale
- M3 mandibulare
- ossicula suturae lambdoideale
- foramen mastoideum

With middle frequency occurred (from $p=0.150$ to $p=0.200$):

- sutura frontalis
- foramen occipital
- sutura supranasalia
- foramen mentale
- foramen maxillare
- tuberculum zygomaxillare
- foramen frontale
- foramina palatina minora
- sutura frontalis.

Table 7. Non- metric characteristic of the skull Berry& Berry 1967).

Berry and Berry (1967)			N	n	p
1	2	Ossiculum fonticuli posterioris	20	-	-
2	3	Ossicula suturae lambdoideae	20	7	0,350
3	4	Foramen parietale	0	10	0,500
4	5	Ossiculum fonticuli anterioris	20	-	-
5	6	Sutura frontalis	20	3	0,150
6	7	Ossicula suturae coronalis	20	-	-
7	8	Ossiculum fonticuli anterolateralis	20	-	-
8	10	Ossiculum incisurae parietalis	20	-	-
9	11	Ossiculum fonticuli posterolateralis	20	1	0,050
10	16	Canalis condylaris paterns	20	2	0,100
11	19	Canalis hypoglossi bipartius	20	1	0,050
12	21	Incisura spinosa	20	-	-
13	22	Foramina palatina minora	20	3	0,150
14	23	Torus palatinus	20	1	0,050
15	26	Foramen supraorbitale	20	8	0,400
16	27	Incisura frontalis accesoria seu foramen frontalne acc.	20	13	0,650
17	30	Foramen supraorbitale accesorius	20	2	0,100
18	56	M3 mandibulare	81	32	0,395
19	55	M3 maxillae	81	6	0,074
20		Foramen mastoideum	20	6	0,300
21		Foramen occipitale	20	4	0,200
22		Sutura supranasalia	20	4	0,200
23		Foramen mentale	20	4	0,200
24		Foramen maxillare	20	4	0,200
25		Tuberculum zygomaxillare	20	3	0,150
26		Foramen frontale	20	3	0,150
27		Spina mentale	20	2	0,100
28		Zygomaticofacial foramen	20	2	0,100
29		Sulci frontales	20	2	0,100
30		Processus paramastiodeus	20	1	0,050
31		Foramina nasalia	20	1	0,050
32		Foramen supraorbitale bipartius	20	1	0,050
33		Processus zygoideale	20	1	0,050
34		Suturae squamo- mastioideale	20	1	0,050
35		Ossicula suturae sagittalis	20	1	0,050
36	51	Torus mandibularis	20	-	-
37	44	Os Ince	20	-	-
38	36	Spina trochlearis	20	-	-

N: number of skulls, for which non-metric features were examined, n: appearance of non-metric features, p: interest of non-metric feature

C) Adult live height and body constitution

I have used 4 methods to estimate live height: Manouvrier's, Breitinger's and Bach's, Trotter and Glesser's and Pearson's methods (Malinowski 1988). The average adult live height was 165.4 cm for male and 159, 1 cm for females. The difference between sexes is 6.3 cm. According Martin (Martin, Saller 1957) the sexual dimorphism should be about 10-12 cm. The population, in which the value of sexual dimorphism is lower than 10 cm, we should find poor (Table 8).

The body constitution is rather subtly and slender (Table 9).

Table 8. Live height.

Sex	Methods (w cm)								
	Manouvriera		Braining and Bach		Pearson		Trotter, Glaser		Medium
	N		N		N		N		
Male	4	162.9	4	167.6	4	164.3	4	167.0	165.4
Female	8	157.8	8	160.9	8	155.2	8	162.7	159.1
Sex difference	-	5.1	-	6.7	-	9.1	-	4.3	6.3

Table 9. Indexes of bone massiveness.

Index of bone massiveness	Sex					
	Male		Female		Undetermined	
	N	Feature range	N	Feature range	N	Feature range
Humerus	1	19.3	3	16.4-19.5	-	-
Ulna	-	-	-	-	4	16.4-20.0
Radius	2	18.1-21.3	-	-	5	18.0-21.1
Femur	2	21.4-24.7	6	18.0-21.6	1	21.7
Tibia	-	-	3	20.0-20.6	1	29.0
Fibula	-	-	2	11.9-14.4	-	-

D) Non- metric characteristic of postcranial skeletons

Because of bad skeletons' conditions and lack of joints, the occurrence of non- metric postcranial features is low (Table 10).

Table 10. Non-metric postcranial features.

No. (Finnegan 1978)		Bone	Features	N	n	p
1	2	Femur	Facies Poirieri	98	-	-
2	6	Femur	Trochanter tertius	98	1	0.010
3	7	Tibia	Facies medialis conquiniscis	98	-	-
4	8	Tibia	Facies lateralis conquiniscis	98	-	-
5	10	Humerus	Foramen supracondylare	98	2	0.020
6	17	Patella	Incisura patellare	98	-	-
7	18	Patella	Fossa patellae	98	-	-
8	21	Calcaneus	Facies articularis medialis	98	1	0.010
9	22	Calcaneus	Continuatio lateralis trochleare	98	-	-

2) The assessment of health and living conditions:

I have estimated such stress indicators as: *cribra orbitalia*, enamel hypoplasia and caries. They are non- specific and give the information about health and living conditions. They appear as a result of organism mobilization due to negative physical and psychological stimuluses.

A) Chosen on physiological stress indicators

1) Cribra orbitalia

Cribra orbitalia amount skeletons from Wyszynski Street occurred in 37.0%. According to poverty ratio we can say, that population wasn't wealthy. Because of few skeletal remains in good condition, *cribra orbitalia* were observed only on female skull - 41.2 % and on undetermined skull – 37.5 % (Table 11).

Table 11. *Cribra orbitalia*.

Sex	Present		Prezent		All	
	N	%	N	%	N	%
Male	-	-	2	-	2	7.4
Female	7	41.2	10	58.8	17	63.0
Undetermined	3	37.5	5	62.5	8	29.6
Σ	10	37.0	17	63.0	27	100.0

2) *Enamel hypoplasia*

Enamel hypoplasia is the lack of enamel on the tooth surface. EH is formed only during the time of apposition of enamel (till 7-8 years old) (El-Najjar et al. 1978; Goodman et al. 1980; Yamamoto 1988; Goodman 1989, 1991; Goodman, Rose 1990). I have used 16 best preserved skulls and loose teeth, found by the postcranial skeletons.

Teeth were found in 76 cases, but enamel hypoplasia was present only in 2 cases (case 28/2-female, and case 315/3 - undetermined sex), so percentage of occurrence is very low (2.6 %; Table 12). This is because of many *ante et poste mortem* teeth losts.

Table 12. The occurrence of enamel hypoplasia.

Present		Absence		Σ	
N	%	N	%	N	%
2	2.6	74	97.4	76	100.0

3) *Caries*

Caries (*caries dentes*) is caused mainly by the organic acids, caused teeth tissue demineralization. Acids are mainly products of bacteria's fermentation (*Streptococcus mutans* and *Lactobacillus acidophilus*; Jańczuk 1981; Einwag, Naujoks 1994; Dąbrowski, Gronkiewicz 1997). Susceptibility to caries among those residents is in general of 68.5 % (70.6 % for males and 60.0 % for females). The occurrence of caries reaches an average of 31.2 % (for males 24.4 %, and for females 32.3 %). A higher occurrence of caries among women can be related to pregnancies and child deliveries (Table 13–14).

Table 13. Susceptibility to caries.

Sex	N	N (dc)	% N (dc)
Male	17	12	70.6
Female	30	18	60.0
Undetermined	28	21	75.0
Σ	75	51	~ 68.5

Table 14. The occurrence of caries.

Sex	Z	C	%C
Males	238	58	24.4
Females	384	124	32.3
Undetermined	385	132	34.3
Σ	1007	314	31.2

B) *Pathological lesions (Tables 15-23):*

1) Congenital lesion was found in 7 cases (Table 15). Asymmetry can be noticed on the skull of adult female in matusus age. On the left side of skull she has no frontal tuber. When we are looking on facies superioris, we can see asymmetry of the left side. The nasal septum is also asymmetric. This is probably plagiocephaly, which is caused by premature closed sutures.

Table 15. Congenital lesion.

Skeleton	Sex	Age	Congenital lesion
314/4	F	maturus	Asymmetric skull with <i>septum nasi</i> asymmetry (<i>plagiocephalia</i> ?) (Fig. 3-4)
64/3	?	Ad	<i>spina bifida</i> incomplete
130/6	F	adultus	<i>spina bifida</i> incomplete
233/1	F	juv	Mikrodontia 2M (jaw- bone left side)
94/-	M	Ad	Tooth compression in jaw- bone
28/2	F	Juv/ ad	Tooth compression and hypoplasia in jaw- bone
196/3	F	adultus	Outgrowth on 1-th rib

2) *Injuries* were found in 9 cases (Table 16):

Table 16. Injuries in skeletal remains from Wyszyński Street in Wrocław.

Skeleton	Sex	Age	Injury
45/3	?	?	Left <i>ulna</i> fracture
64/3 2	?	Ad	Right <i>humerus</i> bone fracture
123/1	M	Ad	Right <i>tibia</i> fracture and abscess (Fig. 8)
154/2	M	Ad/ mt	Knocked out incisors
214/2	F	Adultus	Dislocation of elbow joint (Fig. 7)
228/4	F	maturus	Left <i>radius</i> fracture with displacement (Fig. 5)
231/1	M	Ad/ mt	Coalescence of right shoulder- blade to <i>humerus</i> (Fig. 6)
266/2	F	Adultus	Right <i>tibula</i> fracture
308/3	M	Ad	Right <i>radius</i> fracture with displacement

One of case of injures is coalescence of humerus and scapula (shoulder-blade). Perhaps it can be congenital disease, but more probably is that, this is as a result of injury and unhealed infectious process. The roentgenograh could be very helpfull in this case.

3) *Infectious diseases* were found in 10 cases (Table 10). Three of them were specific infectious diseases:

Table 17. Non-specific infectious diseases.

Skeletal	Sex	Age	Non- specific infectious diseases
233/1	F	juv	<i>Periostitis</i> (Periosteum inflammation) of <i>femur</i>
123/1	M	Ad	Abscess on right <i>tibia</i>
314/4	F	mt	<i>Periostitis</i> (Periosteum inflammation) of left <i>radius</i> . Abscess in jaw
262/3	?	?	Inflammatory of vertebrae (C2 to C 6)
282/4	F	ad	Abscess on left jaw
251/2	M	Mt	Abscess on left and right jaw- bone
154/2	M	Ad/mt	Abscess on right jaw

Non-specific diseases in this series were many cases with inflammatory processes, especially of periosteum.

Table 18. Specific infectious diseases.

Skeleton	Sex	Age	Specific infectious diseases
219/1	?	Ad	Syphilis (?) (Fig. 9)
314/4	F	mt	Tuberculosis (?)
64/4	?	Ad	Tuberculosis (?) (Fig. 11)
?	?	?	Syphilis (?) (Fig. 10)

In case of syphilis changes are mostly on periosteum, which are caused by inflammatory process. This is only probable case of syphilis. For full confidence we should make a histopathological and DNA investigations.

Tuberculosis is caused by bacteria, *Mycobacterium tuberculosis*. In this case we can see variety of TB, Pott's disease, which affects mainly the spinal column. These changes are caused by inflammatory process in vertebrae.

4) *Degenerative changes (Table 19):*

Table 19. Degenerative changes in spine.

Skeleton	Sex	Age	Degenerative changes
43/3	F	mt	Osteophytes
45/3	?	?	Degeneration of <i>vertebrae lumbalis</i>
64/3 1	?	Ad	Osteophytes
64/3 2	?	Ad	Spine scoliosis (Fig. 19C) Grow stiffing of <i>ligamentum flava</i> Vertebras junction (C 2 to C4)
130/6	F	Ad	Schmorl's nodules on cervical vertebrae
154/2	M	Ad/mt	Osteophytes
214/2	F	ad	Osteophytes
228/4	F	mt	Osteophytes (Fig. 12)
314/4	F	Mt	Osteophytes Junction of cervical vertebrae
317/4	F	Mt	Schmorl's nodules
318/5	F	sn	Osteophytes

Table 20. Degenerative changes in postvertebral joints.

Skeleton	Sex	Age	Degenerative changes in postvertebral joints
45/3	?	?	Degeneration of proximal extremity of left <i>ulna</i> Grow stiffing of muscle on right <i>femur</i>
64/3 2	?	Ad	Degeneration of <i>ossa metatarsalia</i>
154/2	M	Ad/mt	Deformation of elbow joint
167/1	M	Ad/mt	Grow shifting of muscle on <i>tibia</i>
214/2	F	ad	Degenerative changes because of elbow joint dislocation
228/4	F	mt	Degeneration of <i>femur</i> Haunch joint displasis Degeneration <i>ossa tarsalia</i>
252/2	M	Ad	Grow shifting of muscle on <i>tibia</i>
262/3	?	?	Grow shifting of muscle on left collar- bone
317/4	F	Mt	Schmorl's nodules Grow shifting of muscle on right <i>humerus</i>

5) *Metabolic diseases (Table 21)*

Table 21. Metabolic diseases.

Skeleton	Sex	Age	Degenerative changes
45/ 3	?	?	Rachitis
317/ 4	F	Mt	<i>Rachitis</i>

6) *Tumors (Table 22)*

Such tumors as osteomas aren't malignant tumour; all of them are mostly smaller than 10 mm.

Table 22. Tumors.

Skeletal	Sex	Age	Tumor
317/4	Z	mt	Osteoma in <i>bregma</i> points
64/3	?	Ad	2 osteomas in frontal bone (Fig. 13)
245/4	M	mt	Osteoma on <i>femur</i>
283/1	?	Ad	Osteoma on frontal bone
64/3	?	Ad	osteoms on loins vertebra

In conclusion we can say, that pathological lesions were not rare in human skeletal remains from Wyszynski Street. Probably, the number of pathological lesions would increase, if the number of complete and well preserved skeletons grew. It was impossible to confirm many of pathological lesions due to lack of complete skeletons.

The most frequent diseases are degenerative changes (21.6%; Table 23) and injuries (19.6%) (Table 23). The most of them were observed in females. But this statement can be false, due to insufficient number of skeletons.

Investigations of pathological lesion give us new information about living and health conditions of citizens of medieval Wroclaw.

Table 23. Pathological lesion.

Pathological lesion	Sex			Σ	
	Male N	Female N	Undetermined N	N	%
Congenital	1	5	1	7	13.7
Metabolic	-	1	1	2	3.9
Tumors	1	1	3	5	9.8
Specific infectious	-	1	3	4	7.8
Non- specific infectious	3	3	1	7	13.7
Degenerations	1	7	3	11	21.6
Injuries	5	3	2	10	19.6
Grow shifting	2	1	2	5	9.8
Σ	13	22	16	51	100.0



Figure 3: Plagiocephaly.

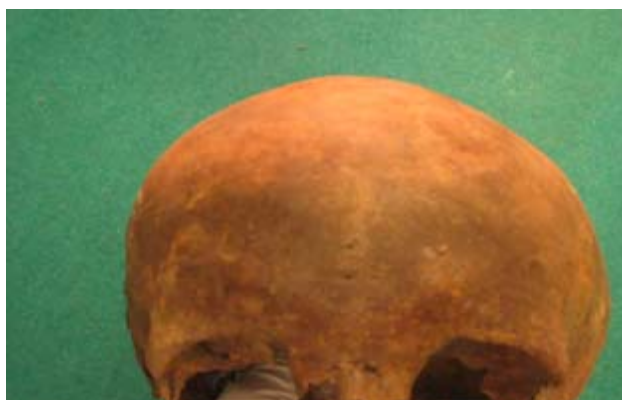


Figure 4: Plagiocephaly.



Figure 5: Injury- left *radius*, fracture.



Figure 6: Injury- coalescence of *humerus* and *radius*.



Figure 7: Injury- dislocation of elbow joint.



Figure 8: Right *tibia* fracture and abscess.



Figure 9: Syphilis- specific infectious disease.



Figure 10: Syphilis- specific infectious disease.



Figure 11: Specific infectious disease- tuberculosis (Pott's disease).

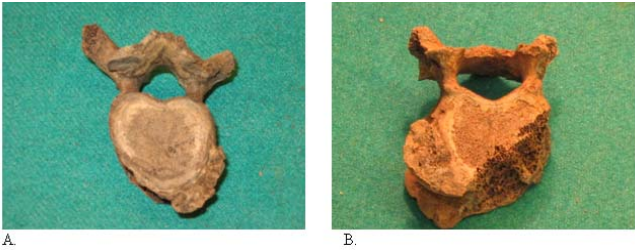


Figure 12: Osteophytes.



Figure 13: Osteomas on frontal bone.

Results and conclusions

Anthropological analysis human skeletal remains from Wyszyński Street in Wrocław reveal:

1. Cemetery from Wyszyński Street is dated from XV to XVIIIth century, but its identification is unsure, because of lack of church on this cemetery.
2. A condition of 98 skeletons from this cemetery is bad and fragmentary (Table 2) and includes 22.4% males, 37.8% females, and 39.8% skeletons of unknown sex (Table 12); the age was unmarked in 18.4% skeletons. The most skeletons were in age *adultus* (40.8%); a half of this were female skeletons. Sex and age was unmarked in 18.4% of skeletons (Table 12). The bad condition of the skeletal remains were caused also by recovering during so- called emergency excavation.
3. The range of metrical characteristic of male and female skulls is similar to the range of other Wrocław's skulls. Analysis of non- metrical skull characteristic indicates that they occur mainly on vault. The arithmetical averages chosen non- relative and relative features of female's skull are approximate to the other chosen to comparative analysis, except skulls from Olbin and Gródek.
4. Analysis of non- metric features on the skulls reveals, the most frequent features (about 50.0%) were: *foramen parietalne*, *incisura frontalis akcesoria seu foramen frontalne akcesorium*, *foramen supraorbitale*, *M3 mandibulare*, *ossicula suturae lambdoideale*.
5. Non-metric features on the postcranial skeletons appeared only on 1-2%, but this small number is probably because of bad skeletons conditions.
6. The adult live high is 165, 5 cm for male and 159, 1 cm for female. The sexual dimorphism ranges 6.3 cm.
7. The live body structure is rather slender (slim), especially in females.
8. *Cribrā orbitalia* is present in 37.0% of individuals, but none of the males skull has *cribra orbitalia*. On this basic population from Wyszyński Street we may find poor.
9. Enamel hypoplasia was present only by 2.6% population, because of lack of many teeth and skulls.
10. Susceptibility to caries among those residents reaches an average of 68.5%. The occurrence of caries reaches an average of 31.2%. A higher occurrence of caries among women can be related to pregnancies and child- birth.
11. Analysis of Wyszyński Street bone collection indicates that various evolutionary changes, traumas, specific and non- specific inflammatory diseases, degenerative changes, as well as tumors did occur with some frequency. From the pathological lesion the most frequency were the degenerative changes and injuries. The less common are: development changes, infectious diseases and tumors. The high frequency of degenerative changes may be due to the hard physical work and activity which can be due to the lowest social status.
12. Morbid changes were very varied and related, together with physiological stress factors, to general health and living conditions of this late medieval and early modern community.

Anthropological analysis human skeletal remains give us the information about morphology, social status, physiological stresses and diseases, which were present in that population. This data allowed us to estimate health and living conditions.

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