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ANTHROPOLOGICAL PROSPECTION OF OSSUARY SITUATED IN SAINT JAMES CHURCH IN BRNO, CZECH REPUBLIC

ABSTRACT: The anthropological research of the ossuary in the Church of St. James in Brno took place between the years 2011 and 2012. The research was connected with the reconstruction of the ossuary and its opening to the public. As it was to be cleared up and re-arranged, the aim of this research was to rescue and examine the original human skeletons buried in the church. It was impossible to examine all skeletal remains due to capacity and technical limitations, therefore only a localized probe in the crypt and subsequent laboratory research could be carried out. During 14 days of field research eight cubic meters of skeletal remains were anthropologically examined, minimal and maximal number of individuals was calculated, preservation of skeletal remains was described as well as the frame contents of a sample.

KEY WORDS: Physical Anthropology – Secondary burial – Ossuary – St. James Church Brno – Human skeletal remains

INTRODUCTION

The Church of St. James is situated in Jakub (James) Square in Brno. The exact date of its foundation is unknown, we assume it was built between the years 1201–1222 (Zůbek 2010). The first reference to its existence comes from 1228 and according to the document of Archbishop Robert from the year 1231 it served the needs of German, Flander and Valone colonists of Brno. In the year 1231 the church was given parish rights, which also meant the right of burial. Originally the cemetery adjacent to the Church of St. James served the new settlers, however, in the year 1293 it started to serve all the inhabitants, according to their parish affiliation (Svoboda 2014). The cemetery was used until the 18th century (the burials finished on December 20th, 1785), when, based on the Emperor's order burials in areas of urban buildings were prohibited (Zůbek 2010).

The area of the ossuary was discovered in 2001 and historical research showed it was probably built in the 17th century. The stone plaque at the entrance shows

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the year 1746. However, historical documents prove that its construction was authorized by the Archbishop of Olomouc in the year 1741. According to the correspondence between the town council and the consistory, its capacity was used up within six years of its opening (Svoboda 2014). Based on the historical facts we can assume that the skeletal remains in the ossuary belong to the Brno inhabitants, originally buried in the cemetery adjacent to the church, who died in the period between the 13th and the 17th centuries.

Anthropological research of skeletal remains from the ossuary in the Church of St. James in Brno took place between the years 2011 and 2012. The research was connected with its reconstruction and opening to the public. Due to the fact that the ossuary was to be cleared up and re-installed during the reconstruction, the aim of the research was to rescue and examine the original skeletal remains. It was impossible to examine all the skeletal material due to capacity and technical limitations of the research. Only a localized probe in the crypt and subsequent laboratory research of taken samples and interesting anomalies of human skeletons could be carried out (Drozdová 2012).

The development of the anthropological research

The original incentive of the anthropological research of the crypt in the Church of St. James was to carry out probes in different areas of the crypt during two weeks of field research. This would have given a chance to find out if there were any differences between the skeletal material reflecting the time sequence of their burial. By the time of the field research most of the skeletal remains had been removed from the crypt so the only possibility was to examine the skeletal material that remained there (*Figure 1*).

In June 2011 when the research was being held, there were skeletal remains in only two areas of the crypt. As researchers did not want to destroy the structure of skeletal remains in the so called "northern" corridor, which clearly shows that the skeletons were buried in the crypt in accordance with a thoughtful pattern, the

FIGURE 1: Ossuary ambient in time of anthropological exploration.

decision was made to examine only the skeletal remains located in the so called "western" corridor. These skeletons were also originally structured according to a regular pattern, which was disturbed while the crypt was being cleared out. The probe was 171 cm wide and the height of skeletal material was 170 cm in the highest spot. Within 14 days of taking sample skeletal material from this area the probe was deepened to 275 cm from the base of the skeletal pile (*Figure 2*).

Whilst taking skeletal material, the researchers discovered the method of burying the skeletons. The skeletons were piled one on top of the other when filling up the crypt. The pile was supported by the "wall" of long bones at irregular intervals. New bones were piled in front of the "wall" and when they reached certain height and depth, a new supporting "wall" from the long bones was built again. This pattern was repeated in the corridor several times. Due to the fact that the system of burying the bones was disturbed in the probe area, it was impossible to determine the time intervals in which the "walls" were built. The system of

burying the bones is clearly visible in a bone formation in the "northern" corridor of the ossuary where the bones were not disassembled (*Figure 3*). However, the pattern here is slightly different from the "western" corridor. The walls from long bones were built not only transversely but also alongside the crypt walls.

At the beginning of the research the crypt seemed to be well aired because it had been left open by the construction company long before the removal of the skeletal remains. There were no signs of any microorganisms only the skeletal remains showed the signs of humidity in a form of brushite mineral crystals on the surface of the bones.

As humidity and temperature in the crypt increased obviously due to the higher number of people (workers and researchers), the grey mould appeared on the crypt walls and ceiling.

At that moment the decision was made to carry out the microbiological analysis in order to determine whether the crypt area was not harmful to people's health. On July 19th, 2011 the samples of marrow for

FIGURE 2: Anthropologically explored area in ossuary of St. James Church.

microbiological analysis were taken and the analysis was carried out by Ivo Sedláček from The Czech Collection of Microorganisms of Masaryk University. The results of the analysis showed that there were no life-threatening bacteria in the crypt.

METHODS

Minimum and maximum number of individuals (MNI)

The examined skeletal material belonged to secondary burials. Therefore the basic research method was the calculation of minimum and maximum number of individuals. In the ossuary in the Church of St. James the method used was the one of White and Folkens (2005). The calculations were carried out for adults and non-adult individuals respectively, based on the analysis from the probe which means from approximately 8 m^3 of skeletal remains buried in the ossuary.

Sex determination

In the case of secondary burials sex determination was difficult due to the fact that it is impossible to distinguish individual skeletons. In the ossuary of the Church of St. James only the sex of adult individuals was determined, based on morphology of the skulls by Novotný method (Iscan, Helmer 1991), morphology and size of pelvis (Novotný 1979, 1981) and size of femur (Černý, Komenda 1980). The sex was determined according to 3 sizes – the biggest length (M1), Sagittal average and Transversal average (M7). If at least 2 sizes showed the same result, it was taken as valid.

Age at death estimation

The age at the time of death was estimated primarily in order to calculate the minimum number of individuals. Firstly, the skeletal remains were simply divided into infant and adult groups based on maturity
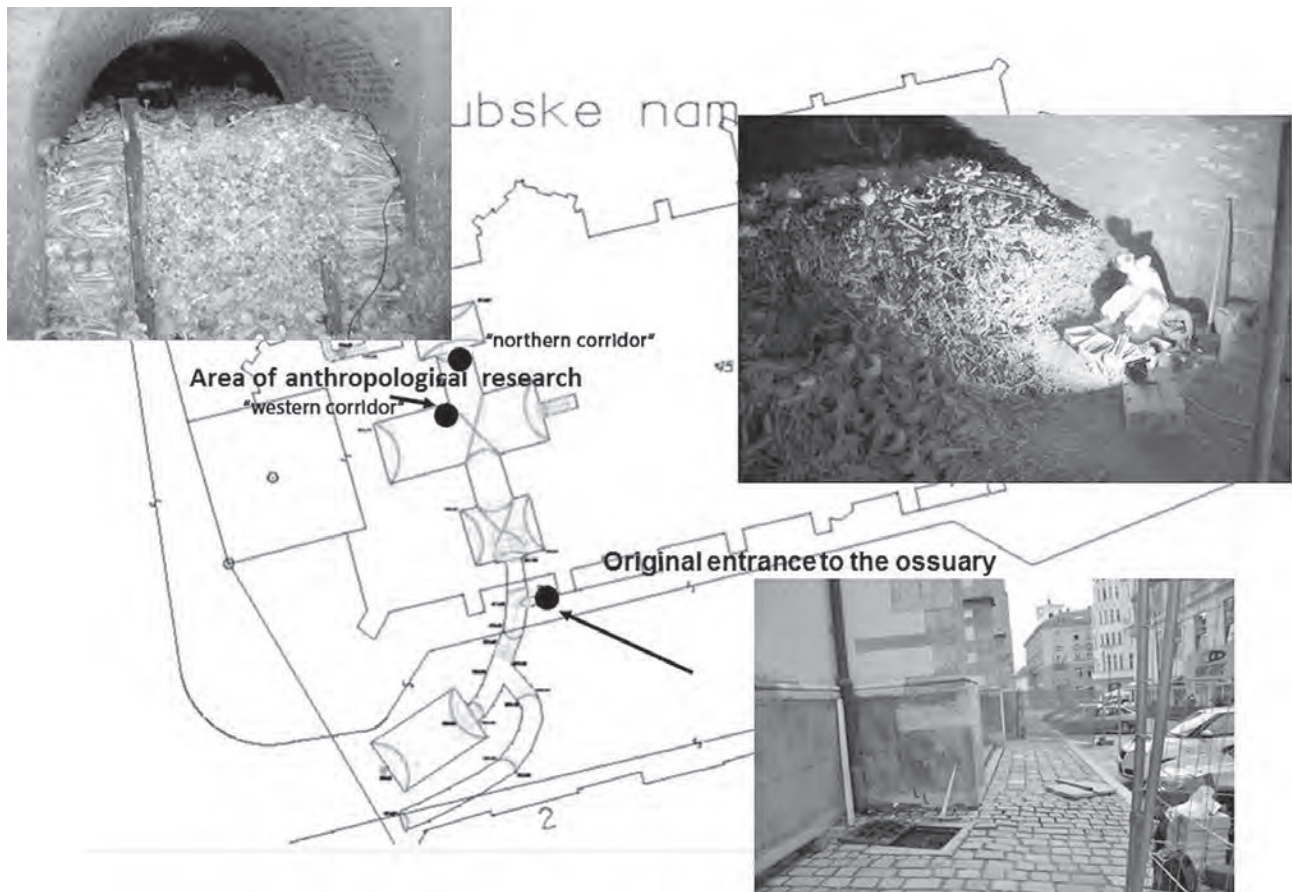

FIGURE 3: Scheme of tomb in St. James Church with marked location of probing area.

of the skeleton, the presence or absence of growth centres on individual bones and the presence of primary, or permanent teeth in maxilla. The same approach was applied in individual teeth.

In order to specify the age frame of the sample, the age of infant individuals was determined according to Ubelaker's scheme of development of deciduous and permanent teeth (Ubelaker 1978). The age of adult individuals was determined according to Lovejoy's scheme of teeth abrasion (White, Folkens 2005) and the degree of cranial suture closure according to Vallois's scheme modified by Rosing (Knussmann 1988).

Stature height estimation

The body height of the individuals was determined in all measurable femurs found in the sample. First the metrical measurements in femurs determined the sex of the individual, then the body height was calculated from the longest femur (M1) according to Sjøvold's equations (Sjøvold 1990). This method can be applied to both sexes and all ethnic groups.

Metrical characteristics of the skulls

The maximum length (M1) and maximum breadth (M8) of the cranium were measured and consequently cranial index was calculated (Knussmann 1988).

RESULTS

Minimum and maximum number of individuals (MNI)

Firstly, pieces of ceramics, animal bones, coffins, clothes etc. were cleaned from all skeletal remains. Secondly, individual bones were divided into groups of adults and subadults iaccording to their maturity. Another division was done according to their types and left / right sides. The sorting of the bones was carried out in the field. The numbers of identified adult and subadults skeletons were put into the table (*Table 1*). Only bones and their fragments were the subject of calculation. Bone meal and crushed material were excluded from the analysis.

The number of preserved complete skulls, loose fragments of cranium and pars petrosa ossis temporalis shows that in the probe there were skeletal remains of minimum 2,302 adult males and females. Maximum number of adult individuals was estimated at 17,917 males and females, based on the number of all identified bones in the probe.

The minimum number of infant individuals in the probe was estimated at 417 based on the number of the right and left femurs. Maximum number of infant males and females was 2,251 the calculation based on the number of all skeletal material belonging to infant individuals.

TABLE 1: Number of bones found in explored area in tomb of St. James Church in Brno.

Type of bone	Adults			Infants		
	dx.	sin.	fragments	dx.	sin.	fragments
Skull males	36		-	-		-
Skull females	40		-	-		-
Skull (complete) undeterminable sex	42		-	-		76
Neurocranium	131		1,727	-		264
Pars petrosa ossis temporalis	131	195	-	10	7	5
Ossa faciei	15		17	1		-
Maxilla	94		223	4		29
Mandible	332		159	203		36
Maxillary teeth isolated – I1 (i1)	5	5	-	-	-	-
Maxillary teeth isolated – I2 (i2)	5	5	-	-	-	-
Maxillary teeth isolated – C (c)	18	18	7	-	-	7

TABLE 1: Continued.

Maxillary teeth isolated – P1	16	24	-	-	-	-
Maxillary teeth isolated – P2	14	21	-	-	-	-
Maxillary teeth isolated – M1 (m1)	51	52	-	8	9	1
Maxillary teeth isolated – M2 (m2)	32	16	-	14	5	-
Maxillary teeth isolated – M3	23	27	-	-	-	-
Mandibular teeth isolated – I1	6	2	-	-	-	-
Mandibular teeth isolated – I2 (i2)	3	4	4	-	-	-
Mandibular teeth isolated – C (c)	16	19	-	-	-	-
Mandibular teeth isolated – P1	11	9	3	-	-	-
Mandibular teeth isolated – P2	25	28	1	-	-	-
Mandibular teeth isolated – M1 (m1)	82	82	1	22	17	-
Mandibular teeth isolated – M2 (m2)	68	49	-	26	5	-
Mandibular teeth isolated – M3	6	3	1	-	-	-
Vertebrae atlas	23		-	-		-
Vertebrae axis	51		-	-		-
Vertebrae cervicales	115		73	5		4
Vertebrae thoracicae	755		69	65		4
Vertebrae lumbales	588		57	65		4
Os sacrum	311		49	36		4
Os coccygeae	3		-	-		-
Os hyoideum	-		-	-		-
Cartilago thyreoidea	-		-	-		-
Cartilago cricoidea	-		-	-		-
Costae	656	606	758	49	63	60
Sternum – complete	9		-	-		-
Manubrium sterni	3		-	-		-
Corpus sterni	3		-	-		-
Scapula	290	213	109	11	15	7
Clavicula	160	161	24	7	4	2
Humerus	474	486	313	79	65	54
Ulna	435	399	57	28	15	9
Radius	389	405	146	21	10	26
Os naviculare	-	1	-	-	-	-

TABLE 1: Continued.

Os lunatum	-	1	-	-	-	-
Os scaphoideum	-	-	-	-	-	-
Os hamatum	-	-	-	-	-	-
Os capitatum	-	-	-	-	-	-
Os trapezium	-	-	-	-	-	-
Os trapezoideum	-	-	-	-	-	-
Os triquetrum	-	-	-	-	-	-
Os pisiforme	-	-	-	-	-	-
MC I	7	5	4	1	-	-
MC II	15	18	1	-	-	-
MC III	22	11	1	-	-	-
MC IV	2	5	-	-	-	-
MC V	7	4	-	-	-	-
Phalanges proximales	3		3	-		-
Phalanges intermediales	2		-	-		-
Phalanges distales	8		-	-		-
Os coxae – os ilium (subadults)	-	-	-	35	46	10
Os coxae – os ischii (subadults)	-	-	-	11	15	3
Os coxae – os pubis (subadults)	-	-	-	3	8	-
Os coxae adult – males	96	97	-	-	-	-
Os coxae adult – females	88	99	-	-	-	-
Os coxae adult – undet. sex	332	378	184	-	-	-
Femur	658	669	291	195	179	43
Patella	4	9	4	-	-	2
Tibia	483	517	284	67	64	66
Fibula	287	223	208	1	2	25
Talus	91	67	2	2	1	-
Calcaneus	114	130	3	1	7	-
Os cuboideum	4	2	-	-	-	-
Os naviculare	6	3	-	-	-	-
Os cueniforme mediale	-	-	-	-	-	-
Os cuneiforme intermedium	-	-	-	-	-	-
Os cuneiforme laterale	1	-	-	-	-	-

TABLE 1: Continued.

MT I	37	41	1	1	1	-
MT II	17	17	2	-	-	-
MT III	14	17	1	-	1	-
MT IV	12	21	-	-	-	-
MT V	17	18	2	-	-	-
Phalanges proximales	2		-		-	-
Phalanges intermediales	-		-		-	-
Phalanges distales	-		-		-	-

Preservation of human skeletal material

Anthropological analysis showed the preservation of the skeletal material as well as representation of particular parts of the skeletons buried in the ossuary (*Figure 4*).

Adults

In adult male and female skeletons the skulls and skull fragments, pelvis, femurs, rib fragments and the fragments of chest and lumbar part of the vertebral column were preserved in the largest numbers.

Other smaller and more fragile bones like scapula, sternum, clavicula, vertebrae cervicales and os sacrum were represented very rarely and in very small fragments. The very sporadic occurences or absolute absence of small hand and foot bones, patella, os hyoideum, atlas, axis and coccyx vertebrae cannot be put down to the fact that they had not been preserved in the original grave. Patella, talus and calcaneus are the most resistant bones of the human skeleton. It seems that they had not been taken from the original graves because of their small size. Another explanation could be that due to their small size they ended up at the bottom of the bone pile in the ossuary and were consequently destroyed by the pressure and decay.

A great number of small bones (patella, and os hyoideum) were found in other places, e.g. in the ossuary of the Church of St. Nicolas in Znojmo (Cimbůrková 2006).

Infants

The results of the calculation of minimum number of individuals clearly showed that the examined sample of skeletal material contained a significantly smaller number of infants than adults (*Figure 4*). The picture illustrates that the most preserved parts of the skeletons were cranial bones and long bones of upper and lower extremities, brachial bones and femurs being represented in largest numbers due to their size and resistance. Other bones were only presented in minimal numbers. Hand and foot bones were not preserved at all due to the fact that these bones ossify late and are found in children either as very tiny foundations of future carpal or tarsal t bones or still in cartilage form and therefore decay very soon after the death of the individual. Infant skeletons are generally smaller and more fragile, with some parts not grown together, such as epiphyses. These are obvious reasons why there were so few preserved infant bones in the sample, which were already badly damaged when taken from the original grave and were definitely not taken completely. This is more probably the reason of minimal presence of infant bones rather than low infant mortality. According to Stloukal and Vyhnánek (1976), the infant mortality in the 19th century was 30%.

Sex structure

Sex determinations in secondary burials is difficult due to the incomplete skeletons. Therefore it is impossible to obtain exact data about the sex structure of the examined sample. The figure about the number of males and females depends on the selection of bones and the degree of their preservation.

In the case of the ossuary of the Church of St. James in Brno the sex determination was carried out by examining skull, pelvis and femur. The choice of these bones was due to the following:

– Pelvis is the most suitable bone for sex analysis because it shows the most remarkable differences between two sexes (due to birth canal).

FIGURE 4: Scheme of conservation of skeletal material coming from explored area.

- Skull enables reliable sex determination and when well preserved, it can also give the characteristics of the examined population thanks to its size.
- Femur reflects the differences between build of both sexes and its length provides the information about the approximate stature height of the individual.

It is impossible to make conclusions about the number of males and females in the ossuary based on these results. The only valuable information provided by this analysis is that in the given collection of skeletal remains both sexes were nearly equally represented, which means no sex selection was made when putting the skeletons in the ossuary. In a normal

population the number of females always slightly prevails (Jürgens 1988). The determined number of males and females was influenced by the degree of preservation and the composition of skeletal material in the probe.

Age structure

Age structure of the probe skeletal remains of the ossuary were examined both in adults and infants.

Age of adults

Thirty five male skulls and 38 female skulls were identified in the examined sample (*Table 2*). Apart from the sex the skulls also revealed the age of the individuals. This was determined on basis of teeth abrasion providing the upper teeth preserved otherwise the age was specified according to the degree of cranial closure.

Table 3 shows that most males from the sample died between the age of 50–59 (45%). 25% males died between the age of 30–39. Other age groups were only represented by a few males, always around 10% of the sample.

The female situation was considerably different. Most females (34%) died 10 years later, at the age of 60 and over, in comparison to males in the age group senilis. 26% females died between the age of 40–49, in the age group maturus I.

When viewing the adult population as a whole, we can see the gradual increase of the dead towards the older age with climax in the age groups maturus II (50–59) and senilis (60 and over).

Age of infants

The age of infants was determined according to the development of deciduous and permanent teeth found in upper and lower jaws. The age was specified in 25 upper and 49 lower jaws, 74 infants in total. Half (37) belonged to the age group infans I (0–6 years), the other half (37) to the age group infans II (7–14 years) (*Table 4*).

Most examined jaws belonged to the children between 5–8 years of age. The jaws of very small children, still teething their milk teeth (under the age of 3) were practically missing, only more resistant lower mandibulae were found (four in number).

Closer analysis of the infant age group is not possible due to the fact that it was secondary burial. The age was determined in randomly found skulls or skull fragments, the good preservation of these made it possible to determine the sex and age in adults but only the age in children. Age structure shows that skulls and mandibulae of all adult and infant categories were presented in the probe. More detailed information about the age structure is not possible.

Skull dimensions

The shape of human skull is a subject of the so called secular trend, which means it changes in time. The members of some pre-historic cultures have their

TABLE 2: Sex structure of adults in ossuary of St. James Church in Brno based on determination by evaluation of skull, pelvis and femur.

Skull (Novotný 1991)		Hip bones (Novotný 1981)		Femur (Černý, Komenda 1980)	
Males	Females	Males	Females	Males	Females
35	38	193	187	153	70

TABLE 3: Age at death structure of adults in ossuary of St. James Church in Brno based on determination by evaluation of skulls.

	Adultus I (20–29)	Adultus II (30–39)	Maturus I (40–49)	Maturus II (50–59)	Senilis (60–)	Total
Males	3 (8.7%)	9 (25.6%)	3 (8.7%)	16 (45.7%)	4 (11.3%)	35 (100%)
Females	7 (18.4%)	4 (10.5%)	10 (26.3%)	4 (10.5%)	13 (34.3%)	38 (100%)
Total	10 (13.7%)	13 (17.8%)	13 (17.8%)	20 (27.4%)	17 (23.3%)	73 (100%)

TABLE 4: Age at death structure of infants in ossuary of St. James Church in Brno based on determination by evaluation of development of teeth of maxilla and mandible.

	Infans I						Infans II				
Age (years)	1	2	3	4	5	6	7	8	9	10	11
Maxilla	-	-	-	1	5	1	6	3	6	3	-
Mandibula	1	3	7	2	7	10	9	5	2	2	1
Total	1	3	7	3	12	11	15	8	8	5	1

characteristic skull shape. They belong to Bell Beaker Culture and their skull shape is brachycranic, which means that the length and the width of their head is the same (Drozdová 2011), unlike Corded Ware Culture, whose skulls are long and narrow – dolichocranic).

A lot of authors have tried to explain the influence of secular trend on the shape of human head but have never come to a satisfactory conclusion. We can recognize a long and narrow skull in the population of Great Moravia (Stloukal, Vyhnánek 1976, Drozdová 2005), where the tendency to shortening and widening of the skull can be already seen in mesocranic individuals. This tendency reached its climax in modern times when the skull widened and shortened and as a result brachycranic males and females prevailed in the population. This situation lasts till now, though in recent population a tendency of narrowing and lengthening of the skull in small children has been noticed (Vignerová *et al.* 2006).

Owing to the fact that most examined skulls in the ossuary were not completely preserved, the descriptions of the male and female skull shapes were only based on the biggest length and width of the cranial and its length-breadth index. Applying this method 35 male and 38 female skulls were examined (their categorization can be found in *Table 5*).

In the sample from the ossuary brachycranic type definitely prevails, both in males and females, which clearly corresponds with an average figures of cranial index for both male (82.6) and female (83.5) population.

In average the skull is short and wide. The second most common type is hyperbrachycranic with very short and very wide skull. Differences can be seen in edge categories. There were a few mesocranic skulls and even one dolichocranic skull in males. The similar situation occurred in females, with four mesocranic skulls. Instead of dolichocranic skull found in males, there was one ultrabrachycranic skull in females, representing the opposite side of the Gaussian distribution.

TABLE 5: Categorisation of Cranial index in preserved skulls from ossuary in St. James Church in Brno (Knussmann 1988).

Martin 1928	Males	Females	Total
ultradolichocran	-	-	-
hyperdolichocran	-	-	-
dolichocran	1	-	1
mesocran	5	4	9
brachycran	21	22	43
hyperbrachycran	8	9	17
ultrabrachycran	-	1	1

Body height

The height estimation of the individuals is part of a metrical characteristics of the examined population. It is mostly based on the length of the long bones, the most suitable one is a femur because it best correlates with the actual body height of the living individual. The height of the male and female population differs because the female figure is approximately 10–13% smaller and thinner than the male one (Molnar 1983). This is the reason why it is essential to know the sex of the individual when estimating the body height. In the ossuary the sex in measurable femurs was determined by Černý and Komenda method (1980), on basis of transversal and sagittal average of the middle part of the bone and its maximum length. The final determination of the sex was established if the result was identical in min. 2 out of 3 dimensions. Subsequently, the estimation of the height was done in male and female femurs. There were plenty of well-preserved femurs suitable for the analysis (223 altogether).

The body height of the figures was determined by Sjøvold method, which, according to the author, can

be applied to all ethnic groups and both sexes (Sjøvold 1990). The stature height was calculated only in adults with epiphyseal closure. In all examined males and females the biggest length of a femur was taken to reconstruct the body height of their figures.

The stature height determination was carried out in 153 male and 70 female femurs, altogether 223. The results show that the average heights of men and women were approximately 170 cm and 159 cm respectively. According to Martin scale the individuals belonged to high statured population in both sexes (Martin 1928). In particular the male body heights represented all spectrum of Gauss scale, the tallest one measuring 191 cm and the shortest 155 cm. Female spectrum was slightly narrower, the tallest being 171 cm and the shortest 146 cm.

When comparing the results of body height reconstruction of the individuals from the ossuary with the stature height of current population, difference is clearly visible due to the influence of secular trend. The current population is taller than the population from the ossuary. Vignerová *et al.* (2006) describe the advancement of secular trend in adolescents and their parents. In the last 110 years the average body height of men and male adolescents has increased by 12 cm whereas the body height of women only by 9 cm in the last 100 years. According to the country's latest surveys of children and adolescents from the year 2001 (Vignerová *et al.*, 2006) the average height of 18-year-old boys is 180.2 cm. The average height of 18-year-old girls is 167.3 cm. In the case of height reconstruction of the dead population there is always a possibility of error in estimation, which is quite big – in the longest femur comes to ±4.49 cm.

CONCLUSIONS

If we wanted to characterize Brno population in the Middle Ages and modern times from an anthropological point of view it would be better to examine the complete skeletons from the Church of St. Michael in Brno (Drozdová 1998) or male and female remains from the large cemetery adjacent to the Church of St. James in Brno (Živný 2011) where the skeletons in the ossuary come from.

Despite all the facts diminishing the information value of the skeletal material in the ossuary, we cannot label the anthropological research of the ossuary in the Church of St. James as meaningless. It brought new information about biological characteristics of the medieval and the modern population in Brno as well as the way the skeletal remains were laid in the ossuary.

Anthropological characteristics of the sample of skeletal material in the ossuary show that the members of the common population were buried there, with females slightly prevailing. Infant and adolescent skeletons were represented in very small numbers, due to bad preservation of skeletal material rather than the absence of infant skeletons. Most men died between the age 50–59 whereas women in slightly higher age – around 60. The average age of men was 48, of women 49. The average age of infants was six years. Both men and women belonged to the population with prevailing brachycranic type of skulls. The average height of men reached 170 cm, of women 159 cm. In the probe comprising 8 cubic meters, skeletal remains of min. 2000 male and female adults and approximately 400 infants were identified. As for the state of health of the examined individuals, the skeletal remains mostly reflected post-traumatic changes, skeletal changes due to the old age of the individuals or the traces of infectious diseases common in the past like syphilis and tuberculosis. The evolution disorders, fatal injuries or tumours were very rare. Dental problems were represented mostly by dental caries and dental calculus. Anomalies like teeth pearls, supernumerary tubercles or hypercementosis (Drozdová 2012) were very rare.

There were also findings of animal bones among the human skeletal material. Only few bones of domestic animals were present in the crypt (according to Miriam Fišáková Nývltová's analysis 2012). Most probably these were part of the kitchen waste taken to the dump, which might have got to the cemetery and consequently to the ossuary together with the human bones.

Based on the research of the ossuary in the Church of St. James as well as other researches in different localities, we can say that there did not seem to be a unified system of placing the skeletal remains in ossuaries.

Different systems of placing the skeletal material is demonstrated by the ossuary in the Church of St. Nicholas in Znojmo (15th–19th c. AD), (Cimbůrková 2006) and the ossuary in the Church of St. Mary in Křtiny near Brno (16th–18th c. AD), (Šenkyřík *et al.* 1994). In Znojmo the skeletal material was found together with soil, coffin remains and burial equipment piled by the walls of the crypt. Apart from that, there were also found 5 complete skeletons tipped out from the coffins by the crypt walls.

The situation in the ossuary in Křtiny is different. We can see complex reverent manipulation with the

skeletal remains, demonstrated by painted skulls, so called "baroque mannequins." From this point of view, the ossuary in the Church of St. James is somewhere in the middle between the two.

The bones placed there were supported by the walls of long bones keeping the skeletal remains in certain shapes. Creating ornaments from skeletal remains or painting the skulls were not habits there.

Unlike the ossuary in the Church of St. James, all skeletal remains in the other two ossuaries were examined, however, the examined material was incomparably smaller than the one in the church of St. James. There were minimal 1,000 skeletons identified in Křtiny and minimal 740 remains of male and female adults and 94 infants in Znojmo, it means that the total number of individuals in both ossuaries is slightly lower than minimal number of individuals found in the probe in St. James's Church. Taking the anthropological characteristics though, all three locations are more or less identical in average age (all fall into the age group maturus), skull dimensions (in all three localities most men and women are brachycranic types) and in the height, which varied around 170 cm in men and 160 cm in women in all three ossuaries. However, there were more differences in pathological changes of the skeletons and various anomalies, mainly due to a different system of placing the skeletons, different climate conditions in the crypts and consequently different stage of preservation of the skeletal material and teeth in all three comparative localities. Another reason can also be a different number of individuals buried in the mentioned ossuaries.

The skeletal remains in the Church of St. James belonged to the population that buried their dead in the cemetery adjacent to the church. This population was buried in a common way and shows the following characteristics (Živný 2010). The skeletal remains of 299 men, 243 women and 208 children were found (discovered) in the cemetery. The age composition suggests that most men died between 40–60 years of age, in the age group maturus, whereas women between 20–40 years of age, in the age group adultus. Most children died between 1–5 years of age. The skull shape in men and women was of brachycranic type in average (83.3 men, 84.0 women). The height reached about 169 cm in men and 156 cm in women.

When comparing the data from the cemetery (Živný 2010) with those from the ossuary, it is obvious that there are only minimal differences, caused by different numbers of examined individuals and different stage of their preservation.

The results of the anthropological research of the skeletal material in the ossuary of the Church of St. James in Brno are only a small sample of the composition of the buried population there. Only a very small part of the skeletal remains (8 cubic meters) from the ossuary was analysed. Therefore it is impossible to establish general characteristics of the whole population buried in the ossuary. However, the results of the probe analysis can be used as an example of the composition of the mentioned population.

Its parameters correspond with the characteristics found in other locations dating to the Middle Ages up to modern times. This fact is demonstrated by the comparison results of the skeletal remains from ossuaries (the ossuaries in the Church of St. Nicolas in Znojmo and the church of st. Mary in Křtiny) and from the cemetery adjacent to the church of St. James, from which the skeletal material in the ossuary most probably came.

The anthropological research of the skeletal material in the ossuary of the Church of St. James in Brno brought further information into medieval and modern population living in the city of Brno area. Another part of a mosaic of our knowledge about Brno population whose skeletal remains were originally buried in graves and subsequently buried for the second time in the ossuary was completed.

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