REGARDING OCCULT SPINAL DYSRAPHISM (SPINA BIFIDA OCCULTA), FOCUSING ESPECIALLY ON A MEDIEVAL POPULATION FROM IASI

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Abstract. Occult spinal dysraphism is a congenital anomaly with a relatively high incidence, which may be located along the spine, from the atlas to the sacrum; it is frequently met in the lumbo-sacral junction, and sometimes it affects the entire dorsal sacral region. Spina bifida occulta usually occurs in relatively high percentages in a population (2-30% of the cases). Despite extensive research, the causes of the appearance of spina bifida have not been completely understood; it is, probably, a multifactorial anomaly, most cases of spina bifida are considered to have been caused by complex polygenic interactions with environmental factors. The osteological material dug up in 2007 at the Centre of History and European Civilization from Iasi, in the cemetery of the “St. Neculai-Ciuruchi” Church (XVI-XVIII centuries), has a total of 680 skeletons taken from 230 graves. In the medieval population from Iasi, occult sacral spinal dysraphism occurs only in 2 cases (mature males), having a percentage of 1.55% of the total number of sacrum and 3.22% of the number of masculine sacrums. Cervical, thoracic and lumbar interlaminar dehiscence did not occur in reports in the subgroup of male nor female. We have found no case of cervical, thoracic or lumbar interlaminar dehiscence.

Keywords: occult sacral spinal dysraphism, spina bifida occulta

Rezumat. Despre disrafismul spinal ocult (spina bifida occulta), cu o privire specială asupra unei populații din Iași medieval. Disrafismul spinal ocult (spina bifida occulta) este o anomalie congenitală cu o incidență destul de ridicată, care poate fi localizată de-a lungul coloanei vertebrale, de la atlas până la sacrum; este frecventă la intersecția lombo-sacrală, uneori însă afecteză întreaga regiune sacrală dorsală. Spina bifida occulta apare într-o populație în limite procentuale destul de large (2-30% din cazuri). În ceea ce privește frecvența spinei bifida nu sunt bine înțelese; este, probabil, un defect multifactorial, marea majoritate a cazurilor de spina bifida fiind considerate a fi datorate interacțiunilor complexe poligenice cu factorii de mediu. Materialul osteologic deshumat în 2007 de Centrul de Istorie și Civilizație Europeană din Iași, din perimetru cimitirului „Sf. Neculai-Ciuruchi” (sec. XVI-XVIII), însumează 680 de schelete provenite din 230 de morminte. Disrafismul spinal sacral ocult în populația medievală șoseană apare numai în 2 cazuri (individii de sex masculin, de vârstă medie), adică într-o porție de 1.55% dacă ne raportăm la numărul total de sacrum-uri și de 3.22% dacă ne raportăm la numărul sacrum-urilor masculine. Dehisența interlaminară cervicală, toracală sau lumbară nu a fost semnalată.

Cuvinte cheie: disrafism spinal ocult sacral, spina bifida occulta

Introduction
Congenital malformations have been described since ancient times. The theory of supranatural causality for explaining them has been predominant from prehistoric times until the XVIII-XIX centuries; they have been often considered a punishment from the divinity. These beliefs have remained strongly rooted in the European mentality for ages and they changed recently, when in the XIXth century, modern attitudes regarding the etiology of malformations appeared. Though they were not fully comprehended at that time, inherited anomalies were recognised by A. Pare in 1649 and by J. Hunter in 1775. However, the genetic theory explaining the causes of congenital malformations became more widely spread after 1900, once Mendel’s law were rediscovered (Savona-Ventura, 2007; Keys Smith, 2001). The anomalies that affect the skeleton are located on the skull bones, at the level of the spine and in appendicular skeleton. The highest incidence of these anomalies was recorded at the level of the spine. Though the term and its medical
description are recent, it is estimated that spina bifida appeared in antiquity. Abnormalities of
the sacrum were reported at the Peruvian skeletons now dated around 5000 B.C. (Goodrich, 2008).
The earliest description of spina bifida belongs to the doctor Peter van Forest, who – in a paper published in 1610 – describes a malformation in the cervical area
of a 2-year old child; it seemed to be a form of spina bifida. The first illustrated example
of spina bifida appeared in the reader Observationes Medicæ, signed by Nicolaas Tulp
(the most important character in Rembrandt’s painting “The Anatomy Lesson of Doctor Tulp”) and published in 1641. Nicholas Tulp is the one who invented the term “spina
bifida” and the first formative description of this disability, considering it a duplication of
the vertebral spinous processes (Goodrich, 2008). In 1832, J. Cruveilhier launched for the
first time the theory of a defective development; later, in 1875, R. Virchow was the first to
describe “spina bifida occulta” (Goodrich, 2008). One of the most important monographs of
the XIXth century about spina bifida was published in 1886 by F. von Recklinghausen (student of R. Virchow), who included two remarkable works in his paper,
regarding the internal and external pathology of spina bifida; he noticed that some
patients having spina bifida occulta survived to adulthood and were physiologically
functional, he also underlined that hydrocephalus is not always associated to spina bifida
(Goodrich, 2008; Marcsik et al., 2002).

The term “spinal dysraphism” (also known as spina bifida, spinal defect, defect
of the neural tube, open/cleft spine), was coined by B.W. Lichtenstein in 1940, referring
to a pleomorphic group of skin and neuronal disorders, it refers to all forms of congenial
disorders of the spine and of the neural tube, implying the abnormal differentiation and/or
the incomplete closure of the median line of the mesenchimal, osseo or neural tissue
(Kumar & Shane Tubbs, 2011). This anomaly most frequently affects the lumbar region,
especially the sacral. The neural spine/tube normally closes starting with the 28th day after
fertilization; the failure of its closure in the cranial extremity leads to anencephaly, while
the failure of closure along the spine causes spina bifida (Fishman, 2003).

In specialized literature, various classifications were mentioned, in order to
globate all spinal dysraphisms and all diseases associated with them. A recent
classification belongs to P. Tortori-Donati who divides dysraphics abnormalities, based on
clinical manifestations and on the embryonic development stage, in: open spinal
dysraphisms and close (occult) spinal dysraphisms, the last category is divided in two
subcategories: with subcutaneous mass and without subcutaneous mass (Tortori-Donati et al., 2000; Kumar & Shane Tubbs, 2011). Another classification of spinal dysraphisms
offers 3 categories: spina bifida cystica (myelomeningocele or meningocele); spina bifida
aperta (lesions that communicate with the environment) and spina bifida occulta (a hidden
form of spinal dysraphism with cutaneous stigmata anomalies located at the bottom of the
spine) (Sav, 2008).

Occult spinal dysraphism is a heterogenous group of lesions that do not
necessarily involve neural tissue visible exposure. Despite the fact that they are called
“occult”, their presence can be betrayed by subcutaneous stigmata (Kumar & Shane
Tubbs, 2001). The simplest variety of occult spinal dysraphism is a fusion defect of the
posterior vertebral arch, resulting in aplasia or hypoplasia of one or both parts of the
spinous process, without being based on neural pathology (there is no protrusion of the
spinal cord or of the spinal meninges). Occult spinal dysraphism is a very frequently met
anomaly and it can be located everywhere along the spine, from the atlas to the sacrum,
more frequently at the lumbo-sacral junction L2/S1 (80% of the cases), but sometimes, it
can affect the entire dorsal sacral region (Saluja, 1986, 1988). On the one side, some
authors have looked at the lumbo-sacral spina bifida as a variant of normality, with no
significant impact on health. On the other side, this can be connected to other pathologies,
such as posterior vertebral disc hernia or neurological abnormalities of legs (Schmorl &

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The individuals with spina bifida occulta do not usually have any external symptom and their defect frequently remains undetected, without any consequences. Even if there are no motor or sensory impairments manifested at birth, sometimes, these appear during growth periods or in adulthood (Sav, 2008). Some individuals suffering from spina bifida occulta can have recurrent pains in the back that radiates to the hips and legs, or stiffness in the affected area, deformity or weakness in legs, loss of reflexes (Saluja, 1986, 1988).

Despite numerous investigations, the causes of the appearance of spina bifida are not understood. Spina bifida is, probably, a multifactorial defect; most cases of spina bifida are thought to have been caused by complex polygenic interactions with environment factors (Josan et al., 2008). Genetic influence is underlined by the presence of a recurrent model inside families and ethnical groups. A number of authors have shown that the risk of appearance of spina bifida at the brothers of the affected persons is about 3-4% (Dias & McLone, 1994). In approximately 95% of the cases of spina bifida, there is no family history of spinal dysraphisms. The combination of genetic and mesologic factors explains why we do not usually see spina bifida “running in the family”, as it is the case of other genetic malformations (Louie et al., 2008). D. Hewitt suggested that inbreeding is a hypothesis for the appearance of spina bifida; this phenomenon would lead to a high percentage among certain ethnical groups (Lovett & Gatrell, 1988). Recent studies have identified a series of mesologic teratogenic factors that can lead to the appearance of a spinal defect: nitrates, lead, valproic acid, oxytetracyclines, some anticonvulsant and antidepressive drugs, pesticides, toxic waste, excessive heat. Because the development of the neural tube takes place within 24 days of embryonic development, exposure to environmental factors should take place during this time, in order to give rise to spinal dysraphism (Fornoff et al., 2004).

There are a number of maternal conditions that may contribute to the development of a descendant with spinal dysraphism: fever, diabetes, obesity, maternal psychological stress, mother’s age, parity. Mother’s race and ethnicity have been well documented by Fray and Hauser, who found that U.S. Hispanics presented an increased risk to have a descendant with spinal dysraphism, the situation is reversed for Afro-American mothers (Fornoff et al., 2004). In the last decade, medical research confirmed that there is a link between the level of folic acid and the appearance of spinal dysraphisms.

The supplementation of folic acid in the diet of fertile women reduces with up to 72% the risk of the appearance of neural tube defects (VSRG, 1991). Until now, it is not clearly known how or why folic acid has this effect. It seems that the basic problem could be an inborn defect of folic acid metabolism rather than a simple lack of it. J. Dobbing suggested in one of his studies that spina bifida is connected to the intake of vitamins, folic acid and zinc, claiming that the lack of these elements, acting together, can interfere with the closure of the neural tube and can allow some teratogenic factors to exert their influence (Lovett & Gatrell, 1988). An extensive project conducted by the Office of Population Censuses and Surveys in London identified a higher number of cases of spina bifida in inferior social classes. Therefore, maternal nutritional status, exposure to teratogenic factors and a genetic predisposition can act together to cause spinal dysraphisms (Lovett & Gatrell, 1988).

The prevalence of the neural tube defects at birth represents a different geographic variability; these prevail in Europe in comparison to Asia or Africa. The abnormality is 2.5 times more frequent at Caucasians than at people of colour, it is widely spread in Great Britain and less frequent in Japan (Sav, 2008). J. E. Fornoff claims that women are more likely than men to have anencephaly and spina bifida (Fornoff et al., 2004). Spina bifida occulta (the most frequently met type of dysraphic anomaly) appears in a population in approximately 17-30% of the cases and it is more common in men than in women (Josan et al., 2008). E. B. Hendricks concluded that 75% of the cases of spina
bifida at the thoracic and/or cervical level were recorded in women, while for the lumbar and/or sacral cases of spina bifida; the rapport sex-ratio was 1:1 (Sav, 2008; Fornoff et al., 2004). Other data confirm that 25-35% among adults frequently suffer from spina bifida at the level of the sacral vertebra S. According to D. Boone, the lumbo-sacral occult spinal dysraphism has an occurrence percentage of 10-30% in a population, while A. Sav, of 2-24% (Sav, 2008; Boone et al., 1985). W. W. Sutow registered a group of adults having a percentage of 26.4% persons suffering from occult spinal dysraphism, at the level of the sacral segment S at the level of the lumbar segment L, only 2.2% (Sav, 2008).

Sacral vertebrae, which are normally 5, fusion in time during the processes of bone growth. Frequently, this number could vary, for example in the case of the presence of the 6th lumbar vertebrae, called lumbo-sacral transitional vertebrae (congenital anomaly more frequently met in men than in women), or in the case sacralisation (the fusion of the last lumbar vertebra or of the first coccygeal vertebrae at the sacrum), or in the case of lumbarisation (total/partial separation, symmetric/assymetric of the first sacral vertebrae from the rest of the sacrum) (Aufderheide & Rodriguez-Martin, 1998; Ortner, 2003; Waldron, 2009). Normally, the halves of the lumbar neural arch fusion in the first year of life in segment L1-L5, at the age of 5 years in the segment L5 and among 7 and 15 years in the segment S1-S5. At approximately 24-25 years, normally speaking, the sacrum is completely ossified, having well knit spinoous processes (Epstein, 1976).

Mild forms of spina bifida are well represented in paleoanthropological collections (most individuals survived until maturity); for example, one can easily recognise sacral spina bifida on a skeleton, its prevalence is significant (Saluja, 1986, 1988). Sacral spina bifida occulta was repeatedly reported as being a congenital anomaly and it was an instrument for detecting specific features in a population, such as degrees of kinship. D. Ferembach interpreted the high prevalence of sacral spina bifida as being a meaningful indicator of biological isolation and endogamy (Kumar & Shane Tubbs, 2011). Most paleoanthropological studies regarding spina bifida focused on the sacrum, even if 60% of the complications that affect human physiology are associated to spina bifida at level L2-S1 and only 10% at level S2-S5 (Kumar & Shane Tubbs, 2011).

Osteological material dug up in 2007 at The Centre of History and European Civilisation in Iaşi, inside “St. Neculai-Ciurchi” Cemetery, has a total of 680 skeletons (children and adults) from 230 graves (individual or reburial). This skeletal series represents a historical population of the medieval Iaşi. According to the data submitted by the excavation team, the time limits of cemetery usage would be the second half of the XVIth century and the end of the XVIIth – the beginning of the XVIIIth century. From a historical point of view, there are various references to the life of the inhabitants in the suburbs of Iaşi, in Tătăraşi and Ciurchi, which were initially considered countryside (suburbs), they later became urban.

A characterization of peripheral slums of Iaşi is offered by N. A. Bogdan, who describes Ciurchi Slum as having small houses, built out of ordinary materials, with unpaved streets, with poor people, which worked a lot with their arms, with carting, agriculture and cattle and poultry breeding. “…The slums of Ciurchi and Tătăraşi often have disturbing rubbish; some streets are hidden, they are in a completely primitive state, they are a receptacle of all dirt, especially because there are no fences; the population is less dense, yards and places are full of dirt, the wells’ water is mediocre; Tătăraşi hill is a high-risk place for catching malaria, because of poor sanitary conditions…” (Bogdan, 1997-2004). This description, dated from XIXth century, underlines the insanitary conditions of the slums of Tătăraşi and Ciurchi; just by a simple play of imagination, we can assume the condition for living in these suburbs before XIXth century.

Regarding possible genitors and inhabitants of Tătăraşi and Ciurchi Slums, according to N. A. Bogdan: “…The name of the Slum of Tătăraşi, a wide suburb on the
eastern hill of Iași, surely comes either from the Tatar camps – the Tatars used to invade the city in order to steal, they searched for accommodation there, at that time when the hill still had a forest; or some of them were more peaceful, for they came in order to work or to trade in this city; the name of The Slum Ciurchi comes from Cercheji, Circażies or Ciurcheni, it is a continuation of Tătărași, having more the aspect of a village, with inhabitants that cultivated crops of vegetables and sold them...” (Bogdan, 1997-2004).

Materials and methods

Unfortunately, the conservation state of the skeletons is precarious; furthermore, many parts or fragments of bones are missing, this made both the anthropological and paleopathological analysis very difficult to carry. The preserved pieces were thoroughly morphoscopically analysed, in order to determine the sex and age of each and every skeleton and of the possible pathologies and anomalies. The sex and death age of each adult skeleton were determined by the use of the methods and techniques recommended by Bruzek (2002), Mays (1998), Brothwell (1981), White & Folkens (2005), Schmitt (2005), Walrave et al. (2004). The age when death occurred, in the case of subadults, was made due to a thorough analysis of deciduous and permanent tooth eruption, based on the development stages of dental buds, by using the methodology proposed by Ubelaker (1979), Schaefer et al. (2009), Scheuer et al. (2000), Moorrees et al. (1963), and by the analysis of the degree of epiphyseal ossification, of the dimensions of the appendicular skeleton and of their belonging to the appropriate age category, according to Fazekas & Kosa (1978), Maresh (1955, 1970), Scheuer et al. (2000), Trotter & Peterson (1969), Jeanty (1983).

As far as nomenclature is concerned, Kumar & Shane Tubbs (2011) recommended the simple assigning of the name spina bifida or spinal dysraphism only to the anomalies noticed on the middle line of the spine, no matter the level of the location. In the absence of hydrocephalus, no matter the size of the spine lesion, the anomaly is not an open spinal dysraphism and it is compulsory for it to be mentioned as spina bifida occulta or occult spinal dysraphism.

Before offering a diagnosis of the anomaly and concluding if the defects noticed at the medieval population of Iași (XVI-XVIII centuries) are cases of delayed fusion of the neural arches, we examined the skeletons as a whole, in order to exclude any possible dysraphisms, according to specialized literature. Kumar & Shane Tubbs (2011) recommends a diagram which allows us to approach this anomaly, taking into account the size of the hiatus and the presence of associated skeletal associated abnormalities. If no bone anomaly accompanies spina bifida occulta, it is more probable a delay of fusion of the vertebral arches. Moreover, the author suggests that, no matter the number of presented cases, it is a good idea to specify the age and the sex of those affected by occult spinal dysraphism. Taking into account the fact that there are not sufficient data regarding sex-ratio when presenting this anomaly, it is necessary to divide the studied group in 2 subgroups, having as criterion sex. The establishing of kinship degrees based on the presence of occult spinal dysraphism can be done only in the case when these statements can be supported by supplementary proves (Kumar & Shane Tubbs, 2011).

We have also studied the presence of other bone anomalies, associated with occult spinal dysraphism: segmentation anomalies, scoliosis, deformities or atrophies of the appendicular skeleton, anomalies regarding the length of legs, vertebral hernias etc. Regarding sacral vertebral arch, some authors (Kumar & Shane Tubbs, 2011) recommend that the cases of spina bifida occulta, localized on segments S₂, S₃ and S₄ should be placed in the limits of normal variation of sacral hiatus.
Results and Discussion

Of the total of 680 skeletons dug in the cemetery of “St. Neculai-Ciurchi” Church, 179 individuals were classified as subadult (infans I, infans II and juvenis), while 501 individuals (224♂ and 277♀) were over 20 years old (adultus, maturus, senilis). Demographic facts regarding the studied medieval population show a high percentage of mortality on the population segment aged between 0-14 years (20.77% for infans I+infans II and 5.44% for juvenis), which means that about ¼ of the population did not reach adult age. For the age segment between 20-x years, the majority frequency of diseases is registered in the maturus stage (56.85%), while at adult age, the percentage is 9.68%, while for the age over sixty – of 7.26%. Feminine skeletons are predominant compared to those which are masculine (55.5% compared to 45.5%); the situation is available both for the adults stage and for the maturus. Life expectancy at birth was calculated as being 34 years (between 0-x years), while for subjects over 20, the obtained life expectancy is 43.89 years for men and 42.33 years for women.

Among the 501 individuals aged between 20-x years, in only 129 cases, the sacrum is present (62♂ and 67♀). From the total of 129, only 2 sacrum bones present occult spinal dysraphism (spina bifida occulta), both coming from male individuals (30-35 years, respectively 40-45 years). Thus, from the medieval population of Iași dig in the cemetery of “St. Neculai-Ciurchi” Church, the percentage having suffered from occult sacral dysraphism is of 1.55% - if we refer to the entire dug population with sacrums and of 3.22% - if we refer to males. The fact that open spinal dysraphisms is rarely met in collections of skeletons, but also the fact that only two cases that we have mentioned are adultus/maturus, make us classify the specific interlaminar dehiscences as being non-pathological “spina bifida occulta”. We remember that we have included in the percentage only the individuals that were over 18 years old, so that to avoid the cases of not finished ossification of the lumbo-sacral vertebral arches.

The first case is that of a male individual (noted R 113 F), having died at approximately 30-35 years. He was dug from a tomb that contained reburials also. On the whole, the tomb number R 113 contained (in anatomic position) 12 individuals: 8 children (six individuals’ infans I; one individual infans II and a new-born child) and 4 adults (1♂ of 30-35 years and 3♀♀, two women of 35-40 years and one of 50-55 years). The skeleton of the man of 30-35 years, his waist was approximated at having 1645 mm, wellasshaped and almost complete. From the cranial segment which is highly deformed in ground, the basiocipital is missing, the left part of the craniofacial structure and the left mandibular ramus. The cranium does not have any anomaly or pathology. The following components are missing from the postcranial segment: the cervical vertebrae C₁ and C₂ (atlas and axis), toracal vertebrae T₁, T₂, T₃ and T₁₂, lumbar vertebrae L₄ and L₅, left patella, mesosternum, left scapula, right calcaneus and taluses. The sacrum of the individual R 113 F (Fig. 1) has 2 disruptions: the first is located in segment S₁, the second – in segment S₃-S₅, which make us suppose the existence of the occult spinal dysraphism, the “posterior spina bifida occulta” type. As far as the hiatus from S₁ is concerned, the malformation without signs or clinical associated symptoms, this represents 20% of the total forms of closed spinal dysraphisms and a failure of the fusion of the posterior vertebral S₁ arches (Tortori-Donati et al., 2000).
The sacral hiatus in the segment S₂-S₃ is a defect frequently signaled in specialized literature. If we guide ourselves using the methodology of some authors, because of the high frequency of a sacral disruption at level S₁ and S₃ and of an intermediate frequency at the level of S₂, it seems that spina bifida occulta at the level of the sacral vertebrae S₁, S₂ and S₃ should be considered as being a part of the limits of normal variation of sacral hiatus. Despite the mentioned facts, from the perspective of identifying dysraphisms, no matter the segment of the appearance of the hiatus on the spine, these should be reported (Kumar & Shane Tubbs, 2011). Several authors have signaled a series of orthopaedic problems associated with sacral spina bifida occulta, such as abnormal spine curvings, deformation of leg bones or hip sprain, intervertebral disk herniation (Kumar & Shane Tubbs, 2011). In the case of the individual R 113 F, the two interalar sacral dehiscences, limited by segment S₂, are associated with a series of traumatisms and patologies: the right femur has a fracture in the lower third (defectively consolidated); the left ulna has a fracture in the middle area (correctly consolidated); the two clavicles - arthritis in the area acromial facet and osteophytes on the sternal facet; both radius - osteophytes on the bicipital tuberosity; the right fibula - having a deeply deformed diaphysis (curved); right coxal bone - with osteophytes on the iliac crest; the vertebral segment T₅-T₁₁ has moderate exostoses and poorly developed Schmorl’s nodes; the vertebral segment L₁-L₄ – with moderate exostoses and highly developed Schmorl’s nodes (disc herniations through the vertebral endplate from overloading of the spine).

In the second case, we refer to another male individual (noted M 126 A), aged 40-45 years. He was buried in M 126 together with two subadultus (a newly-born and an infants II). The postcranial skeleton of the man is incomplete, but the presented osseous parts are well-preserved (the calculated waist has 1706 mm), while the skull has only the frontal bone. From the postcranial skeleton, the following are missing: the right talus, fragments from scapulae, left clavicle, humeruses, left ulna and left radius. Except for the sacrum, the other segments of the spine are represented only by a few fragments that have their origin in the vertebral bodies, without visible patologies.
This individual has a sacrum with dorsal interlaminar dehiscence S₁-S₄ (almost total occult sacral dysraphism), posterior laminae of the sacral vertebrae are not well-knit in this segment. The remaining space between laminae is like a canal (Fig. 2). We mention that, in general, the localization of the sacral hiatus lower than the segment S₁ of the spine is a rare conclusion. Despite the fact that this sacral spinal dysraphism is large enough, we remained reserved in this respect, due to the mature age reached by this individual (40-45 years old), and the few associated signaled anomalies, such as: bilateral spondylosis of L₄ – defect of the ossification of vertebral interarticular parts (Fig. 3) and incompleat central lumbarisation of S₁ (Fig. 4).

Conclusions
The present paper presents the rapport on the appearance of occult spinal dysraphism (spina bifida occulta) at a medieval population from Iași, dug in the cemetery of “St. Neculai-Curchii” Church, dated from the XVI-XVIII centuries. The prevalence that we have calculated for the dehiscence of the posterior sacral vertebral arches is quite low (1.55% of the total number of the sacrums and 3.22% of the total number of masculine sacrums) compared to the values obtained for other European medieval populations, quoted in specialized literature. We mention that we have found no case of cervical, thoracic or lumbar interlaminar dehiscence. In this moment, it is neither known for sure the cause of dysraphic spinal defects and why they are less frequent in some parts of the world than in others, nor if they are the results of genetic mutations, chromosomal abnormalities or the action or teratogenic factors during intrauterine embryo development. The origins of spinal dysraphism are considered to be multifactorial, involving genetic predisposition and environment factors having a shutter role. The present study does not identify the etiological factors and does not show the way in which genetic factors interacted with mesologic ones in medieval Iași, but it draws the attention on two cases of spinal occult dysraphic anomalies, both located on masculine sacrums: one belongs to a 30-35 year old male and has a sacral hiatus in S₁ and S₁-S₄, while the second also comes from a male having the death age of 40-45 years, his hiatus is interlaminar and wide, almost total (S₂-S₄).
