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A "pithecoid feature" in skulls confirming possible neuro-psychiatric disorders. The diagnoses of an anthropologist of the nineteenth century

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Abstract. B*ackground and aim:* The interest for the morphological research of degenerative signs aimed at identifying personality pathologies characterized positive anthropology of the late nineteenth century. The increasing exploitation of statistical-epidemiological methodologies together with the recent neuroscientific acquisitions, risk dangerous effects on mono-factorial models on the understanding of antisocial behavior. *Methods:* Through historical analysis of the research carried out by the positivist anthropologist Giuffrida Ruggeri on the lack of the glenoid dimple of the temporal of the alienated, the authors examine the criticality of rigid and one-way psychopathological interpretative approaches also in relation to recent applications of neuroscience. *Results:* Increasingly, the scientific approach seems to abandon an interpretative vision anchored to rigid biological and statistical parameters to embrace a dimension adequate to the singularity and complexity of man. In this approach, neurosciences contribute to supporting the circularity of the interpretative model of antisocial behavior. *Conclusion:* Far from a deterministic return that assigns a decisive role to constitutional factors, new knowledge leads us to reflect on mutual, continuous and harbingers of biology and the environment in the characterization of the human being, in a constructive dialogue with ethics.

Key words: Giuffrida Ruggeri, aggressiveness, structural cognitive modifiability, neuroscience, epigenetics, violence, determinism, free will

Introduction

The "positivist anthropology" of the late nineteenth century sought in abnormal craniometrics characters the connection with certain pathological conditions.

The psychiatric and anthropological literature of 19th century showed several contributions which demonstrate how criminal anthropology influenced the psychiatric thinking of the time leading it to identify the deviated features both degenerated and both ancestral. In particular, the atavism theory carried out some anthropologists to find specific correlation between the anatomical features and the "abnormal" behaviors.

In this contribution, we want to re-examine an interesting research published in the Phreniatry Review which illustrates that some morphological characteristics of the skulls, conserved in collections of psychiatric institutes, were closely linked to degeneration and madness.

This is the article by Professor Vincenzo Giuffrida Ruggeri entitled "A new pithecoid character in 13 alienated patients (absence or incompleteness of the glenoid dimple of the temporal), called Giuffrida-Ruggeri's stigma"(1).

The well-known professor of anthropology taught at the most prestigious Italian universities (Rome, Pa-

via, and Naples) and undertook a series of researches on the anatomy of the human skull, on facial morphology and on the various somatic characters of the populations of northern Italy, on topics of normal and pathological anthropology (1–5).

Giuffrida believed that the glenoid dimple, where the condyle of the jaw is inserted, is found neither in the felines nor in the rodents and was missing especially in anthropomorphic apes.

The professor, in fact, conducted this research in the Natural History Museum of Florence and analyzed several anthropomorphic skulls where he found a flat surface instead of the glenoid dimple of the temporal, characteristic of modern man. However, the anthropologist observed the lack of glenoid dimple of the temporal in thirteen skulls of alienated people at the Craniological Museum of the Psychiatric Institute of Reggio-Emilia.

The cases

The first skull that Giuffrida examined, numbered 399, had belonged to an epileptic man from Modena who died at the age of twenty. The professor examined the skull anthropometrically, as was the practice of positivist anthropology. It denoted an ovoid, brachycephalic a leptorrhine nose with a normal nasal aperture between the interorbital distance. The condyles of the mandible and the right glenoid dimple were described as normal. However, he emphasized that the left one was extended anteriorly, thus exceeding the spheno-temporal suture, thus lacking any trace of articular tubercle, there was a flattening where the glenoid dimple must have been. Among the other anomalies that he pointed out he also noticed the opening of the metopic suture and the spheno-basilar suture. The encephalon weighs 1322 grams.

The second skull that he examined, numbered 185 of the craniological collection, belonged to a male, also of Modena and also an epileptic and who died at the age of 34 years. The craniometry showed a hyper brachycephalic form. The absence of the glenoid dimple was recorded on the right while the left one appeared normal. The encephalon weighs 1380 grams.

In his report he also inserted skull number 1154 which had belonged to a Modenese who had been diagnosed in the medical record as "maniac for alcoholism", they were also outlined under the anthropometric profile as brachycephalic. In this case both glenoid dimples were flat. The weight of the encephalon is 1145 grams.

The skull numbered 789 belonged to an epileptic man from Modena who died at the age of 41. In this case the craniometrics index showed a plagiocephalic and a mesaticephalic form. The right glenoid dimple was completely absent, being described as a flat and uniform surface extending from the spheno-temporal suture to the zygomatic bone. Among the other "pithecoid" characters, Giuffrida also reported the protruding raised eyebrows and the asymmetrical occipital hole in its shape and located largely in the right half of the skull. The brain's weight was 1125 grams.

In the investigation he examined the skull belonging to a woman from Modena, who was suffering from pilgrim lipomania and died at the age of fifty-five. Also in this case the cephalic calculus delineates a skull of brachycephalic form and the right glenoid dimple extends forward occupying the space where it was normally occupied by the articular tubercle while the left glenoid dimple extends less forward. Other atavistic features of the skull are recorded at the level of the jaw, which was strongly asymmetric as well as asymmetrical, and additionally the palatine bones presented themselves. The weight of the woman's brain was 1235 grams.

Among the other skulls listed by the anthropologist was number 274, this also belonged to an epileptic who died at the age of 41. Of mesaticephalic shape, the skull showed the absence of the glenoid dimple in the right region. Among the pithecoid characters he also added protruding eyebrow arches, while the weight of the encephalon was 1335 grams.

The skull number 337 belonged to a woman of Reggio, she had been affected by lipomania and died at the age of 34 years. Brachycephalic in shape, the skull is generally described as very asymmetrical with a remarkable prognathism. In describing the pithecoid character under discussion, Giuffrida reported that instead of the glenoid dimples there were simply two slight imprints. There is no lack of other anthropological anomalies reported by the author as a highly asymmetric mandible as well as the zygomatic arches and the occipital hole was elongated in anteroposterior direction. The weight of the brain was 1069 grams.

The skull number 1205 belonged to a woman from Reggio and was suffering from periodic madness. The shape of the skull was described as follows: plagiocephalic and brachycephalic form. The right glenoid dimple was not bounded anteriorly and the left was limited only by a thin margin. The weight of the brain was 1375 grams.

The next skull considered pithecoid for the description of the character of the glenoid dimples is number 847, belonging to a woman, age not revealed, whose diagnosis was that of pellagrous characterized by a brachycranial form. The glenoid dimples, especially the right one, are not well defined. At the level of the lambdoid suture, the author describes numerous supernumerary bones and the weight of the encephalon is 1250 grams.

The skull number 1081 was of a woman from Reggio, whose clinical history described her as belonging to a neuropathic family suffering from acute delirium. The woman, who died at the age of 62, had a mesaticephalic skull. Both glenoid dimples appeared as a flat surface extending to the rear zygomatic inlets. The weight of the encephalon is 1205 grams.

The next skull, number 1166, of mesaticephalic shape and whose glenoid dimples had anomalies such as poorly marked margins and the left side is covered longitudinally by a bone crest, belonged to a woman who died at the age of thirty-three. The jaw was asymmetrical and the skull was slightly plagiocephaly. The brain's weight was 1315 grams.

The skull number 1123 belonged to a woman with lipomania and a neuropathic family who died at the age of forty-seven. The mesaticephalic skull had a shallow right glenoid dimple and a rough surface in correspondence with the articular tubercles. An asymmetric mandible and an elongated occipital hole were registered by the author. The weight of the encephalon was 1085 grams.

The last skull described, number 841, was that of a woman from Carrara, diagnosed as a maniac and died at the age of 53. She had a brachycephalic skull with an enormously extended and circular right glenoid dimple. The brain's weight was 1180 grams.

According to the author, the fact that the rough surface takes the place of the articular tubercle makes the presence of the glenoid dimple impossible.

The comparison between the presence and absence of the glenoid dimple of the temporal bone between the skulls of the alienated and those of the delinquents (13 out of 1000 in the first and 1 in 25 in the second) was to interpret this morphological feature, link to the low intellect of the people who own it (6-8).

However, he did not give any consideration with regard to the kinds of illness precisely because the cases he analyzed were few. In fact, he recorded only few cases of absence of the glenoid dimples on over a thousand skulls of the insane from the psychiatric collection.

Giuffrida also reports the presence of one of the 25 skulls of delinquents in the psychiatric collection of Reggio presents the absence of the glenoid dimples of the storm.

Another consideration that the author highlighted was the greater presence of this anomalous in the female subjects, therefore believing that the consideration of his colleagues, who said that in the female sex degenerative characters were less present than in men, was wrong.

Discussion

This contribution of a new pithecoid character, or rather the absence of the glenoid dimple of the temporal represents one of the many observational methods of the positivist anthropologists of that time who related anthropological anomalies to psychiatric anomalies (9).

Although Prof. Giuffrida-Ruggeri neither had initiated any form of revolutionary idea nor opened any new chapter, the prestigious Journal *Nature* in his necrology underlined that "his voluminous writings reflect more fully than those of any other writer the anthropological problems discussed by his contemporaries in Europe and America" and "By his death modern anthropology loses one of its most imposing and interesting figures" (10).

From the second half of the nineteenth century, immediately after the development of evolutionary theories, many anthropologists insisted on searching for atavistic and degenerative characters and at times almost excessive, physical characteristics were determined to delineate anomalous personalities.

The resulting achievements of science in the mid-nineteenth century also urged prevailing attention of the positivist anthropologists to the soma as object more easily identifiable, measurable and assessable as part of a rigorous scientific research. By abandoning the interpretative approach of a speculative nature, the identification of deviant forms through anthropometric feedback offers support for criminological theories. However, this approach does not take due account of the experimental verification principle as a certain criterion.

Ruggeri's Giuffrida assessments must therefore be interpreted according to the model of positivism in its most closed phase which penalizes an interpretative approach on the unity of body and psyche, in an orientation that tends to sanction a materialistic vision of human behavior. In this spirit, Pierre Jean Georges Cabanis (1757 - 1808), a well-known French doctor, declared: "The brain secretes thought, just as the liver secretes bile".

The development of research has shown the limitations, illusions and errors of positivist science which, unfortunately, inspired prisons and psychiatric hospitals between the nineteenth and twentieth centuries, to recognize, on the contrary, the profound impact of the "environmental" component in the psychic joint.

For many decades, medicine has abandoned a vision of science anchored to rigid ethno-morphological parameters, typical of positivist thought at the end of the 1800s, to adhere to a holistic and non-sectarian approach.

Even the "evidence-based medicine" (EBM) itself is today subjected to severe critical analysis when it apodictically claims to deduce the clinical decision from the value of statistical-epidemiological evidence (11).

Certainly, these critical observations do not imply the rejection of the value of scientific evidence or, even less, of the usefulness of EBM, they simply remind us to have caution in their use. This is in order not to slip into the dangerous pitfalls of scientism or dogmatism, by taking due account of that reference to the limits of science invoked and theorized by the great scientists of the past and present from Pascal to Godel (12, 13).

To think that a certain anomaly can be correlated with a certain disturbance is a gross limit. The specific feature observed by Giuffrida in thirteen skulls of alienated people kept at the Craniological Museum of the Psychiatric Institute of Reggio-Emilia, is part of the natural variability of human and animal anatomical structures and it has no meaning. As the Lombrosian idea of a "reverse evolution", that is, of the re-emergence of ancestral characters in modern men, is completely without foundation.

The approach to the bio-psycho-social model has also determined the overcoming of the biological reductionism of mental illness, typical of the classical German medical-organic model, focused on the psychophysical deficit of the individual ("*all mental illnesses are brain diseases*", using the emblematic definition of Griesinger) (14). This different reference model, attentive to the interaction between biological and psychological, psychosocial and environmental singular components, today solicits a different and more complex interpretation of the person and, also, of the individual deviant acts that requires an open and multidisciplinary interpretative methodology (15).

Even the same paradigm of "rigidity" and "static" of the brain, based on the progressive decrease of neurons, has now been abandoned. In fact, research has shown that cognitive modifiability and brain plasticity are conditions that are not limited only to the early stages of childhood, but characterize the entire life cycle of man, in relation to different experiences and different stimuli, including environmental stimuli (16, 17). Even if the precise mechanisms of plasticity are not yet completely understood, it turns out that experiential factors model the neural circuits underlying social and emotional behavior.

Moreover, if it is widely proven that traumatic events "leave marks" on the emotional circuits of the brain, it has also been shown that other situations, such as pregnancy, stimulate the proliferation of dendritic spines and synapses (18, 19).

In addition, it is useful to point out that on the basis of the growing evidence on the modulation of gene expression, through "epigenetic" processes, the attention of scholars has focused precisely on these mechanisms and on the role they can play in the development of behavior.

In the (re)discovery of the complexity and multiplicity of the various variables involved, clinicians today criticize, to an ever-greater extent, a certain rigid

cognitive approach of pathology based exclusively on statistical evidence, to rehabilitate the observational-empirical criteria, intuitions, sensitivities and individual clinical experience. The concept, nowadays increasingly widespread, of "complex sick" expresses the need for the clinician to maintain his role as a wise reasoner and interpreter, with respect to an only aseptic adherence to scientific-experimental evidence.

In the analysis of Giuffrida's study we cannot forget the limited knowledge of the time. Today we know that the temporomandibular articulation is a complex joint, with significant intra- and inter-individual variability and only the recent use of computerized tomography has allowed for more reliable measurements to be performed (20).

Furthermore, in a critical reading of this historical work, a considerable limit is represented by the extreme variety of psychiatric pathologies by Giuffrida Ruggeri in a common morphological anomaly, psychiatric disorders are totally different from one another: from mental retardation to circular madness. The association between the anomaly and a specific disorder is very small and in the world of evidence-based medicine, this deficiency is really a hazard.

Conclusions

The analysis of a historical article on the correlation between morphological character and intellectual deficiencies brings out the never-quarreled controversy between determinists and indeterminists.

The lack of understanding of the complexity of man and also of the circularity of the outcomes of the various mechanisms of action of the various determinants, underlying human actions, are certainly some fundamental limits of positivist thought.

However You always learn from history (20-22). History teaches us that science and its certainties are always in constant evolution. The scientific results, even the most innovative and seductive ones, must always be carefully weighed and subjected to rigorous critical and logical scrutiny.

Even after a century, the errors of Giuffrida and his time must be present when we risk moving from somatic to genetic determinism or when evaluating the weight of the environment in comparison with that of DNA. Similarly, we must bear in mind the naive nineteenth-century belief that we can draw conclusions on the functioning of human behavior starting from formalin skulls and brains when we interpret brain images obtained with cutting-edge technologies such as functional magnetic resonance imaging or positron emission tomography.

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