

The evidence for achondroplasia in 1st century AD Italy

Among the number of works of ancient art on display at the National Archaeological Museum of Naples (MANN), Italy, is a mosaic (50×50 cm) dating to the second half of the 1st century AD from the Vesuvian area, possibly Pompeii, and formerly in the Borgia collection, classified as *Dwarf with a rooster* (inventory number 10 003, room LXVII; figure).¹ Mentioned in 19th century guidebooks (titled as *Caricature: a dwarf giving a piece of grass to a rooster*), the work also appears in Domenico Monaco's guide to museum collections,² where it is titled: *Dwarf feeding two gamecocks and holding a palm branch out to one of them (Pompeii)*. In a later Italian version of the guide, however, a much more generic and misleading description, *Man in a cloak giving grass to two roosters, perhaps with the intent to steal them (Pompeii)*, is given. Monaco's guide suggests that the work portrays a servant caught in the act of giving the palm of victory to a rooster, breasted and proud of his success over his adversary, another rooster next to the first that is portrayed with his head bowed to the ground.

The representational style is so-called illusionism (Flavian age, IV Pompeian style, second half of the 1st century AD) and characterised by the use of colour that gives greater dynamism to the bodies.³ In this work, the overall perception is that of a grotesque caricature, in which the solemnity of the gesture of the conferral of the palm of victory is contrasted by the features of the man who is exactly the opposite of the ancient Greek concept of *kalokagathia* (a combination of physical beauty, moral rectitude, and military valour).³ Roman mosaics were characterised by a high degree of verism, with a progression from less realistic

depictions showing a lack of complete sense of scale in the last two centuries BC (such as in the Nile mosaic of Palestrina) to a more accurate form of representation during imperial Roman history.⁴ Therefore, the precise anatomical references identifiable both in the servant and in the rooster allow us to use this iconographic source as a resource for a retrospective zoological and medical diagnosis.

The artwork, subjected to an in situ visual inspection by three authors (FMG, VP, and EV), was examined from archaeozoological and paleopathological perspectives.

Some characteristic traits of achondroplasia in the servant, including short stature, megalcephaly with frontal bosses, short fingers in his hands (trident hand), and disproportion between limbs and trunk can be observed.⁵ This condition has been the subject of numerous

artistic depictions throughout history.⁶ Equally, the morphology of the roosters (particularly the winner) allows them to be identified as *Gallus gallus* (Linnaeus, 1758; domestic form), of a type similar to today's Siciliana breed, a variant that was widespread in ancient Italy during the Roman Empire.⁷ Although the rooster appears to have hyperextended lower limbs, an overall height of 65–78 cm can be speculated considering the range reported in the literature.

By measuring the height of both the servant (39 cm while in anterior flexion and 43 cm in the upright position) and the rooster (28 cm) using digital photography programmes and creating a mathematical proportion with the known real height of the roosters (considering the extremes and their average), it is possible to estimate the servant's stature. Using the ratio of the man to rooster (43:28 cm) in the artwork, the minimum real height



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Figure: Mosaic depicting a man offering the palm of victory to a rooster
National Archaeological Museum of Naples (inventory number 10003). Image reproduced with permission (permission ref Rif. Prot. N.3589 – 08.05.2018. Class. 28.13.10/410).

of the rooster (65.00 cm) indicates a male height of 99.82 cm, the average real height of the rooster (71.50 cm) indicates a male height of 109.80 cm, and the maximum real height of the rooster (78.00 cm) indicates a male height of 119.23 cm. The average height of the man is therefore estimated to be 109.62 cm.

Two of the estimated statures (109.80 cm and 119.23 cm) fall within the 100–140 cm range expected for contemporary people with achondroplastic dwarfism.⁸ In addition, the morphological characteristics of the man highlighted above allow us to exclude the identification of a short-statured servant, labelled at the time as a Central African Pygmy, as assumed by some authors.³ Other types of constitutional dwarfism appearing in the bioarchaeological literature can also be anatomically excluded.

Achondroplasia, a rare genetic disorder that is caused by a mutation in *FGFR3* and inherited on an autosomal dominant basis, is the result of cartilage not fully developing into bone. Currently, the disorder affects about one of 20 000 to 30 000 live births. Bones that are formed primarily by intramembranous ossification, such as the skull, grow to typical size, while those bones formed by a cartilaginous precursor through endochondral ossification, such as the limb bones, are substantially shorter than typical due to the gene mutation. As a result, people with achondroplasia are short in stature with altered limb proportions.^{5,8}

Historical and artistic evidence of achondroplasia in the ancient world is quite rich and the antiquity of the condition can be traced back to as far as prehistoric times.⁹ In the Roman

world, depictions of individuals with achondroplasia typically give them special attributes, and often put them in absurd contexts. In contrast, bioarchaeological evidence for the condition in Imperial-era Italy is very low, with just one case possibly identified in skeletal remains from the Collatina necropolis (1st to 2nd centuries AD) near Rome.

Historical sources describe a marked passion on the part of the ancient Greeks for cockfighting, a sport considered illegal in most countries nowadays. Roosters were admired animals, since they were considered perfect representatives of warrior virtues.¹⁰ For a long time it was believed that cockfighting ended up spreading naturally from Greece to Rome. In particular, Magaldi's observation seems reasonable: "[t]hat in a city deeply permeated with Hellenism, such as Pompeii, there was a Greek custom, is not surprising".¹⁰ However, the scarcity of clear mentions of this pastime in ancient literary sources has been highlighted, a phenomenon perhaps circumscribed to certain social and territorial realms.

This Correspondence adds to the overall knowledge on the antiquity of achondroplasia and confirms that an interdisciplinary approach (appendix) to ancient art can also contribute to the detection of ancient pathologies and their historical manifestation.

We declare no competing interests.

**Francesco M Galassi, Laura Landini, Kristina Killgrove, Marco Artico, Lorenzo Rossi, Veronica Papa, *Elena Varotto*

francesco.galassi@biol.uni.lodz.pl
elena.varotto@unipa.it

Department of Anthropology, Faculty of Biology and Environmental Protection, University of Lodz, Łódź 90-237, Poland (FMG); FAPAB Research Center, Avola SR, Sicily, Italy (LL, VP); Ronin Institute, Montclair, NJ, USA (KK); Department of Sensory Organs, Policlinico Umberto I, Sapienza University of Rome, Rome, Italy (MA); Museo dell'Ecologia, Cesena, Emilia-Romagna, Italy (LR); Department of Economics, Law, Cybersecurity, and Sports Sciences & School of Science, Engineering and Health, University of Naples "Parthenope", Naples, Italy (VP); Archaeology, College of Humanities, Arts and Social Sciences, Flinders University, Adelaide 5001, SA, Australia (EV); Department of Cultures and Societies, University of Palermo, Palermo, Italy (EV)

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See Online for appendix