Lancet Diabetes Endocrinol 2024
Published Online
July 15, 2024
https://doi.org/10.1016/S2213-8587(24)00185-2

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, megalocephaly 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

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]

See Online for appendix

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)

1 Borriello MR, Museo nazionale di Napoli, archivio fotografico Pedicini. Le collezioni del Museo archeologico di Napoli. Milan: Rome: Leonardo, 1989: 122.
2 Monaco D. Handbook of the antiquities in the National Museum at Naples. Naples: Stabilimento tipografico Lanciano e Veraldi, 1906: 15.
3 Ciardiello R, Pappalardo U. Mosaici greci e romani: tappeti di pietra in età ellenistica e romana. San Giovanni Lupatoto: Arsenale Editrice, 2010: 66.
4 Richter GMA. The origin of verism in Roman portraits. *J Rom Stud.* 1955; **45:** 39–46.
5 Brook CGD, Dattani MT. Handbook of clinical pediatric endocrinology. Chichester,: John Wiley & Sons, 2012: 84.
6 Galassi FM, Rühli FJ . Depiction of differential etiologies of dwarfism by Il Veronese (1528–1588). *J Endocrinol Invest.* 2016; **39:** 593–4.
7 De Grossi Mazzorin J. Introduzione e diffusione del pollame in Italia ed evoluzione delle sue forme di allevamento fino al medioevo. In: Fiore I, Malerba G, Chilardi A, eds. Atti del 3° convegno nazionale di archeozoologia: siracusa 3–5 novembre 2000. Rome: Istituto poligrafico e Zecca dello Stato, 2000: 351–61.
8 Pauli RM. Achondroplasia: a comprehensive clinical review. *Orphanet J Rare Dis.* 2019; **14**: 1.
9 Aufderheide AC, Rodríguez-Martín C. Cambridge encyclopedia of human paleopathology. Cambridge: Cambridge University Press, 2005: 358–60.
10 Magaldi E. I ludi gallinarii a Pompei. *Historia* 1929; **7:** 471–85.

THE LANCET
Diabetes & Endocrinology

Supplementary appendix

This appendix formed part of the original submission. We post it as supplied by the authors.

Supplement to: Galassi FM, Landini L, Killgrove K, et al. The evidence for achondroplasia in 1st century AD Italy. *Lancet Diabetes Endocrinol* 2024; published online July 15. https://doi.org/10.1016/S2213-8587(24)00185-2.

General note on the aim and scope of this article

The goal of this article is to offer an interdisciplinary perspective on achondroplasia in the past by showing how not only direct sources of information (i.e. skeletal remains) but also artistic representations can add to the palaeopathological record of this condition. Since the very beginning, palaeopathological research should also take into account the so-called 'indirect sources' of information on past diseases. This area of research falls under the umbrella of a sub-branch of palaeopathology known as 'palaeo-pathography' (see Rühli et al. 2016, in the following *Bibliographical Addendum*) but can also be considered as part of the anatomy-and-art research field (Morriss-Kay G, Fraher J (2010) The art of anatomy. *J Anat.* 2010; **216:**157).

Bibliographical Addendum

For more information on the described mosaic, see:

De Caro S. I mosaici, la Casa del Fauno: guida alla collezione. Napoli: Electa, 2001: 6

The discussed 19th century museum guide that mentioned the investigated mosaic is to be found in:

VV.AA. Guida Storico-Statistica Monumentale dell'Italia, 6th ed. Milano: L. Ronchi, 1861: 844.

The later edition of Monaco's guide including a less precise description of the mosaic is the following:

Monaco D. Guida delle antichità del Museo Nazionale di Napoli. Napoli: Stabilimento tipografico Lanciano e Veraldi, 1915: 83.

Additional information on the art of Roman mosaic can be found in:

Cartwright M. Roman Mosaics. World History Encyclopedia, 2013. Online at: https://www.worldhistory.org/article/498/roman-mosaics/ [Accessed 25 January 2022].

Rutledge S. Ancient Rome as a Museum. Power, Identity, and the Culture of Collecting. Oxford: Oxford University Press, 2012: 94.

Methodological considerations on how to use artworks to make retrospective diagnoses can be found in:

Rühli FJ, Galassi FM, Haeusler M. Palaeopathology: Current challenges and medical impact. *Clin Anat* 2016; **29**: 816–22.

For the zoological identification and related historical aspects, see:

Blanc C. *Pullus*, *gallus* et *gallina*: déclinaisons antiques. *Rev ethnoécologie* 2017; **12**: 1–23.

Scanes CG, Christensen KD. Poultry Science. Fifth Edition. Illinois: Waveland Press, Inc, 2020: 43.

Schille H-J. Polli. Atlante delle razze. Bologna: Edagricole-New Business Media, 2010, *passim*.

For how dwarfs were seen in the Roman world, consult:

Brunet S. Dwarf athletes in the Roman empire. *Anc Hist Bull.* 2003; **17**: 31–46
(on dwarfs involved in Roman ludi and performances as entertainers).

Dasen V. L'enfant qui ne grandit pas. *Med Secoli.* 2006; **18**: 431–457 (with a focus on childhood disabilities).

Dasen V. Dwarfs in Ancient Egypt and Greece. Oxford: Oxford University Press, 2013, *passim*.

Dasen V. Des musiciens différents? Nains danseurs et musiciens dans le monde hellénistique et romain. In S. Emerit, ed. Le statut du musicien dans la Méditerranée ancienne: Égypte, Mésopotamie, Grèce et Rome. Cairo: IFAO, 2013: 259–77 (for a broader discussion on the involvement of dwarfs in other typologies of entertainments such as parodic fighting. The possibility that the dwarf in question was part of parodic exhibitions cannot be ruled out *a priori*, especially in light of the caricatural effect of the scene as a whole – nonetheless there is no definitive proof to support this).

With reference to the case of dwarfism from the Collatina necropolis:

Minozzi S, Lunardini A, Catalano P, Caramella D, Fornaciari G. Dwarfism in Imperial Rome: a case of skeletal evidence. *J Clin Res Bioeth* 2013; **4**: 154 – it should underlined that, despite its methodological correctness, that paper was published in an OMICS International journal. For ethical considerations on this category of journals, see: Eriksson S. Where to publish and not to publish in bioethics – the 2018 list, 2018. Online at: https://ethicsblog.crb.uu.se/2018/05/02/where-to-publish-and-not-to-publish-in-bioethics-the-2018-list/ [Accessed 25 January 2022].

Another ancient artistic instance of dwarfism are mentioned in:

Martino E. The fight between a dwarf and a stork (Mosaic I century BC). *J Endocrinol Invest.* 2017; **40**: 1025.

Dwarfs – pygmies in this cases – are also documented in Nilotic scenes, of which a notable example is also to be found at the MANN Museum. Of note, the dwarf presented in this mosaic appears in a Roman context, unlike pygmies who appear transposed in a legendary Egyptian context where parodic fighting scenes are depicted. See also: Dasen V. D'un monde à l'autre. La chasse des Pygmées dans l'iconographie impériale. In: Trinquier J, Vendries C., eds. Chasses antiques. Pratiques et représentations dans le monde gréco-romain (IIIe siècle av. - IVe siècle apr. J.-C.). Rennes; PUR; 2019: 215-233.

Among the published bioarchaeological cases of non-achondroplastic dwarfism, see also:

Meyer S, Galassi FM, Böni T, Seiler R, Bickel S, Rühli F. Mummified proportionate dwarfs from the Valley of the Kings. *Lancet Diabetes Endocrinol*. 2019: **7**: 173–4. https://doi.org/10.1016/s2213-8587(19)30028-2

Molto JE, Kirkpatrick CL (2018) How short is short, and why? A probable case of proportionate dwarfism from Egypt's Third Intermediate Period in the Dakhleh Oasis, Egypt. *Int J Ostearch*. **1**: 3–17.

On the downsizing of cockfighting as a widespread sport in the Roman world, see:

Morgan MG. Three Non-Roman Blood Sports. *Class Q.* 1975; **25**: 117–22

Vespa M. Rituale, spettacolo o gioco d'azzardo? Memorie del combattimento dei galli in Grecia antica. Considerazioni linguistiche e antropologiche. In: Floridi L, Neri L, Torre C, eds. Giochi e giocattoli: parole, oggetti e immaginario, *Enthymema* 2019; **23**, 434–60.

Acknowledgements

The authors wish to thank the National Archaeological Museum of Naples (MANN) for granting them permission to reproduce the image of the artwork [inv. 10003] analyzed here. This study was presented as a poster at the 9th congress of the Associazione Italiana di Archeozoologia (28 November – 1 December 2018, Ravenna, Italy).

Funding statement

This research did not receive any specific grant.