

Marcellinus' *De pulsibus*: a Neglected Treatise on the Ancient "Art of the Pulse"¹

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The aim of this paper is to bring to light the neglected treatise *On the Pulse* of the otherwise unknown physician Marcellinus (second century C.E.?) and the unique and revealing evidence it contains. The paper demonstrates the importance of this treatise for our understanding not only of the theory and practice of the ancient "art of the pulse", but also of the interaction between physicians and patients in antiquity and of ancient medical deontology. It focuses on two parts of the work; first, Marcellinus' introduction on the interdependency of practical and theoretical training in this art, which testifies, for example, to the interest of lay people in this diagnostic method, to the attention given by ancient physicians to the need to put the patients at ease before examining their pulse and to the physicians' sensitivity to their patients' fears and expectations in face of disease and the medical examination; second, Marcellinus' lucid and rare explanation of the actual method of examining patients' pulse, from which we learn about both the ideal manner of palpation, as well as the common errors performed by physicians in this respect.

Introduction

Among the works in the corpus of Greco-Roman writings on the pulse we find a short and neglected treatise entitled *On Pulse* (Περὶ σφυγμῶν) composed by a physician of the Roman period named Marcellinus. This treatise, which seems to have been intended as a handbook or didactic textbook for physicians, offers a concise overview of the ancient "art of the pulse" (ἡ περὶ τοῦ σφυγμοῦ τέχνη) — the physiology, definition and types of pulse in different conditions and the actual method of examining the pulse.

The examination of patients' pulse was one of the most important diagnostic methods used in antiquity. From early in the third century B.C.E, shortly after the identification of the pulse as the natural motion of the heart and arteries, the pulse had become an essential and popular tool for diagnosing patients.² This practice was

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² The earliest evidence in our sources for the identification of pulsation as a natural phenomenon occurring only in a particular system of vessels (namely, the arteries) is attested for Praxagoras of Cos (late fourth and early third centuries B.C.E.). Before his time

accompanied by a long and lively debate on the physiology of the pulse, the types of pulse, their names and the diagnostic and prognostic significance of each type. This debate took place in writing, during public demonstrations and in oral interactions among physicians.³

Most of the information on this part of Greco-Roman medicine derives from Galen, whose six treatises on the pulse are a rich source on this subject, but are, nonetheless, still works of one and the same author and thus advocate a particular set of views.⁴ Besides Marcellinus' work we find three anonymous treatises attributed spuriously to Soranus (in Latin, entitled *Peri sphigmon* [*sic.*], *On the Pulse*), Rufus of Ephesus (entitled Σύνοψις περὶ σφυγμῶν, *Synopsis on the Pulse*) and Galen (Περὶ σφυγμῶν πρὸς Ἀντώνιον φιλομαθῆ καὶ φιλόσοφον, *On the Pulse to Antonius, Eager Student and Philosopher*). Being one of the few non-Galenic works on the pulse, Marcellinus' work offers an important testimony to the ancient debate on the pulse, especially since it is not just a summary of the views or works of others: Marcellinus takes a stand and plainly asserts his opinion in the debates of his time and addresses pressing problems concerning the use of the pulse in medical practice. He thus serves as a concrete example of one of the many anonymous physicians who took part in the extensive debate on the pulse. It puts, we can say, a "face" to at least one of the participants of whom we mostly only hear *about* (for the most part in Galen), rather than hear *from*. More to the point, since Marcellinus uses terminology and adheres to views specifically refuted by Galen concerning the physiology and properties of the pulse, his work is an important example for how these non-Galenic opinions were actually put to use or positively incorporated into the discourse, rather than as a target for refutation alone.⁵

Marcellinus' work offers, moreover, rare (and at times unique) and valuable evidence not only about these theoretical and terminological aspects of the ancient "art of the pulse", but also about the deontology and practice of examining the pulse, as well as about the interaction in antiquity between physicians and their patients in a broader historical context. It is thus particularly regretful that no dedicated study of the work and of its importance has been attempted, that no translation has been produced in order to make this work available for a broader audience and that the only available edition of this treatise (published in 1907 by Hermann Schöne) is not based on the entire manuscript tradition.⁶

the vascular and cardiac motions were generally considered unnatural motions occurring only in extreme emotional or pathological conditions and were used only sporadically in diagnosis, see on this: Duminil (1983), 311-316; von Staden (1989), 268-269; Lewis (2014), 139-140; Lewis (forthcoming).

³ On the rhetorical and historical context of the debate, see: Barton (1994), 133-168; Asper (2005). For the content of the debate, i.e. the theoretical theory on the pulse, see in particular: Wellmann (1895a), 169-201; Harris (1973); von Staden (1989), 262-288.

⁴ Galen's works are: *On the Differences of the Pulse*; *On Distinguishing the Pulse*; *On the Causes of the Pulse*; *On Prognosis from the Pulse*; *Synopsis of his own Books on the Pulse*; *On the Pulse for Beginners*.

⁵ See below, p. 199.

⁶ A new edition of the text based on all manuscripts, accompanied by an English translation and commentary is being prepared by Heinrich von Staden in the series of the *Corpus Medicorum Graecorum*. Harris (1973), 257-261 discusses some of the theoretical parts of

This paper aims to bring to light this neglected treatise and to begin to study its particular contribution to our knowledge on the ancient “art of the pulse” and Greco-Roman medicine. In particular — since a comprehensive discussion of all the parts of the treatise and their content cannot be attempted here — this paper examines what Marcellinus’ treatise teaches us about the actual method of palpating the pulse of patients and about the course of the medical examination in general, and more broadly about the interaction between physicians and their patients and the transmission of medical knowledge to lay people. To this end the paper focuses on two particular parts of Marcellinus’ treatise, which contribute not only to the narrower scope of the history of the theoretical debate on the pulse, but also to our understanding of the broader picture of Greco-Roman medicine. These parts are (i) Marcellinus’ didactic introduction on the importance of theoretical and practical training (ll. 1-21⁷) and (ii) the section explaining how to actually palpate the pulse (rather than interpret it) (ll. 114-172).⁸ Unlike the theoretical sections in Marcellinus’ work, which are commonly found in other pulse treatises, these didactic and practical sections are not readily found in our sources and are thus worthy of a dedicated study.

Section 1 introduces the author, while section 2 describes the structure and content of the treatise and briefly discusses the theoretical parts of the treatise and their relation to the general debate on the pulse. Section 3 examines Marcellinus’ discussion of the importance of a long training period and the interdependency of the theoretical and practical training. Section 4 explores the method and manner of examining the pulse and the physician’s conduct during the examination as described by Marcellinus.

1. Marcellinus

The name of the author is stated in the final line of the treatise: ‘the end of Marcellinus’ [writings] on the pulse’, (τέλος τῶν περὶ σφυγμῶν Μαρκελλίνου, l. 511).⁹ This Marcellinus is otherwise unknown and although some tentative suggestions have been made to identify him with various physicians named Marcellinus or Marcellus, who are mentioned in Galen and other sources (not, however, in the context of the pulse), the uncertainty is too great to take such possibilities into account in an analysis of the work.¹⁰ The dating of the treatise is also uncertain. The latest physician mentioned by Marcellinus and constituting a *terminus post quem* is Archigenes of Apamea, who was

Marcellinus’ works, and some of the historical evidence arising from Marcellinus’ work is discussed in Lewis (forthcoming), but these sections in Marcellinus deserve a comprehensive discussion of their own accord, which is my present aim.

⁷ All references to Marcellinus are according to line numbers in Schöne’s edition.

⁸ Throughout this paper I use the phrase ‘palpation of the pulse’ to refer to the actual touching of a patient’s wrist while examining (i.e. measuring or “taking”) his/her pulse. Although it is the patient’s wrist, skin or arteries that the physician actually palpates, I find that the term ‘palpation of the pulse’ better conveys the idea of the Greek expressions ἀφή τῶν σφυγμῶν or ἄπτεσθαι τῶν σφυγμῶν (‘touching the pulse’) used in our sources.

⁹ Unless otherwise noted, all translations are my own.

¹⁰ For some attempts, see: Schöne (1907), 449-450; Nutton (1999), *DNP* 7, col. 913.

active in Rome during the reign of Trajan.¹¹ Based on the absence of any reference whatsoever to Galen and his vast corpus of pulse treatises (written during the sixth and seventh decades of the second century C.E.) and on Marcellinus' style of writing, Heinrich von Staden has concluded that the treatise was written in the middle of the second century C.E.¹² Schöne, on the other hand, has argued that the absence of any reference to Galen does not constitute a *terminus ante quem* and claims that the style and method of the author points to a later period, which he ambiguously describes as one 'in which the great medical schools of the imperial period were no longer active'.¹³

Several things point to Marcellinus being a practicing physician.¹⁴ The treatise as a whole has the air of a practical manual with the aim of presenting a student or a practicing physician with a summary of the knowledge required for using the pulse as a diagnostic tool. More telling are Marcellinus' critical reference to laymen (ἰδιῶται, l. 2), the stress he lays on the importance of experience and practice to render theoretical, "bookish" learning useful and accurate, and his concern with the physicians' dignity, reputation and success.¹⁵ He mentions his own experience of examining a pulse only once,¹⁶ but he often asserts his own opinion on ongoing debates concerning the pulse.¹⁷

2. *De pulsibus*: Structure and Content

The treatise offers the essential information required for correctly interpreting a patient's pulse — both the "theoretical material" and "practical guidelines". It defines the phenomenon at hand (i.e. the pulse), explains how it is generated physiologically and lists and defines the qualities belonging to the pulse and their different manifestations. It then explains how exactly the palpation of the pulse should be performed in order to ensure a correct and accurate identification of the different qualities of the particular pulse being examined. Finally, it offers information to guide the diagnostic and prognostic interpretation of the pulse, that is, the information that will allow the physician to identify the disease from which the patient suffers and offer a prognosis of the expected course of the illness.

Throughout most of the treatise the different topics are introduced by means of a title consisting of a question (e.g. τίς ὁ ἐκλείπων σφυγμός; 'What is the failing pulse?'; τίς ὁ τοῦ πυρέσσοντος σφυγμός; 'What is the pulse of the feverish?'). Titles of this kind were common in medical treatises of the Roman period and can be found, for instance, in

¹¹ On Archigenes, see: Wellmann (1895a) and (1895b); Nutton (1996b); Mavroudis (2000).

¹² Von Staden (1989), 282 n. 150.

¹³ Schöne (1907), 449-450 (my own translation from Schöne's German).

¹⁴ Cf. Schöne (1907), 450; Harris (1973), 259.

¹⁵ See below, sections 3-4.

¹⁶ Ll. 429-432: 'Herophilus, who was the first to name the "gazelling" pulse says that he saw it [only] once, in an eunuch, *but we have encountered it* often in our work in cases of [patients] suffering from phrenitis or lethargy' (the emphasis is my own).

¹⁷ He states, for example, his preferred definition of the pulse (ll. 81-82) and his opinion on the relation between the speed and frequency of the pulse (l. 176).

such works as the Ps.-Galenic *Medical Definitions* and Soranus' *Gynaecology*, as well as in medical papyri ranging from the second century B.C.E. to the fourth century C.E..¹⁸

The treatise begins with an introduction (with no dedicated title) on the necessity of acquiring long practical training in measuring and interpreting the pulse, on the interdependency of theory and practice and of reason and sense-perception in this method, and on the importance and value of the pulse as a diagnostic and prognostic tool, a claim supported by an appeal to Hippocrates (ll. 1-58). Marcellinus then lists various explanations of the physiological mechanism generating the pulse (ll. 59-69), as well as definitions of the pulse according to the type of motion of which it consists (e.g. diastole and systole) and the bodily parts in which it occurs (e.g. the heart and arteries) (ll. 70-89).¹⁹ Following this Marcellinus lists the qualities by which one pulse differs from another, namely: size; strength and weakness; speed; frequency; fullness; regularity; evenness; rhythm (μέγεθος, σφοδρότης, ἀμυδρότης, τάχος, πυκνότης, πληρότης, τάξις, ὀμαλότης, ῥυθμός) — and he explains the different degrees by which the size, strength and fullness are measured.²⁰ Before continuing to discuss the other qualities (i.e. the difference between speed and frequency — ll. 173-203; on evenness and unevenness — ll. 204-221) Marcellinus first explains in detail (under the title: τίς ὁ τρόπος ἐπαφῆς σφυγμοῦ; 'what is the manner of touching the pulse?') how to actually palpate the pulse (ll. 114-172) (e.g. how many fingers should be used, where they should be placed and in what manner).

It is noteworthy that Marcellinus' list of the qualities of the pulse follows Archigenes' theory and terminology and differs from Galen's, who disagrees, *inter alia*, with the term ποιότητες and speaks instead of the 'kinds' (γένη) and 'differences' (διαφοραί) of the pulse. Marcellinus' use of the terms 'full' (πλήρης) and 'empty' (κενός) pulse as indicators of the content of the arteries (ll. 92, 106-113) also reflects terminology associated with Archigenes and bitterly criticised as ambiguous and misleading by Galen, who opted instead for the terms 'hard' (σκληρός) and 'soft' (μαλακός) pulse as indicators of the condition of the walls of the arteries, rather than of their content.²¹

¹⁸ On this style in medical papyri see Leith (2009).

¹⁹ Marcellinus does not mention any names in the section on the generation of the pulse (ll. 59-69), whereas in the following section he lists the definitions of Hegetor, Bacchius, Heraclides of Erythrae (all followers of Herophilus), Athenaeus (of Attaleia), Asclepiades (of Bythina) and Archigenes (of Apamea).

²⁰ On the meaning and history of these terms and the debate concerning the terminology used for describing the pulse and its variations, see: Harris (1973), 181-195, 244-251, 253-256, 258-259, 397-431; von Staden (1989), 262-288; Campos (2006), 102-112.

²¹ Gal. *De dign. puls.* 4.3 (K. 8.948.1-14), as well as Harris (1973), 255-256, 402. Several other points in Marcellinus' discussion of the physiology and definition of the pulse are of interest, for example: the reason he gives for defining the pulse as the *natural* (φυσική) expansion and contraction of the heart and arteries (ll. 87-89, cf. ll. 81-82) is slightly different than the one found in Galen (e.g. Gal. *De diff. puls.* 4.3 [K. 8.722.9-723.1]); his doxographies of the opinions on the generation and definition of the pulse are similar to those in Galen, but whereas Marcellinus distinguishes between the physiological explanations of the generation of the pulse and the definitions of the pulse, Galen presents

At line 222 begins Marcellinus' diagnostic exposition of the characteristic pulse in different diseases, ages and seasons as well as his description of particular types of pulse — a feature common to all pulse treatises. Marcellinus begins with the pulse indicating fever,²² and after explaining that the difficulty in identifying and comprehending fever has led to a disagreement among the physicians (ll. 223-226), he presents the various positions on this topic (ll. 234-287): namely those of Chrysippus (presumably of Cnidus, the teacher of Erasistratus²³), Erasistratus (of Ceos), Herophilus (of Chalcedon), Asclepiades (of Bithynia), Hippocrates, Archigenes and Praxagoras (of Cos). Marcellinus' reference in this section to Herophilus' use of a clepsydra for measuring the frequency of patients' pulse and to Praxagoras' description of a particular pathological pulse are of particular value, for they are not mentioned by any other author.²⁴

The sections on the characteristic pulse to be expected during affliction by other diseases are shorter and mention neither names nor a variety of opinions, but only Marcellinus' own description of the types of pulse that appear during various diseases, for instance: he describes the pulse in phrenitis (a severe and often lethal mental disease) as fast, frequent and irregular, usually small, but sometimes large; in lethargy (a lethal disease characterised by extreme weakness as well as mental symptoms) as slow at times, big and rare; and in pleuritis (a kind of pulmonary inflammation) as neither big nor small at first, fast, frequent and one in which the stroke felt upon the fingers is strong.²⁵

Following this section Marcellinus describes (under the title: *τίνας οἱ καθ' ἑκάστην ἡλικίαν κατὰ φύσιν σφυγμοί*; 'What is the natural pulse at each period of life?') the natural pulse of each age group (ll. 333-359). This distinction of differences in the natural pulse of different age groups dates back at least to Herophilus, i.e. to the third century B.C.E.²⁶ According to Marcellinus, for instance, the pulse of infants is fast and

the physiological theories as a particular kind of *definition* of the pulse (e.g. *ibid.* 4.12, [K. 8.756.9-757.8]).

²² Cf. Ps.-Rufus, *Syn. puls.* 5, pp. 225-226 Daremberg–Ruelle.

²³ See most recently Berrey (2014), in particular 424, 427-428.

²⁴ Ll. 254-277, 283-287. On Herophilus' method and the significance of this evidence by Marcellinus, see: von Staden (1989), 282-283; Berrey (2011) 73-81; Lewis (forthcoming). For the importance of the information about Praxagoras, see Lewis (2014), 193-195.

²⁵ Ll. 289-290, 296-297, 303-304. These are only excerpts from his description of the pulse in these diseases, in some cases he goes into further detail and distinctions. The list of diseases differs from those in Ps.-Soranus (who has only a short sentence about the pulse of each disease) and in Ps.-Rufus. These authors also differ on the pulse they attribute to some of the diseases that they mention commonly. Ps.-Rufus also singles out fever, but does not list the opinions of other physicians (*Syn. puls.* 5, pp. 225-226 Daremberg–Ruelle). For an overview of the ancient conception of fever, to which physicians such as Erasistratus, Archigenes and Galen dedicated long treatises, see: Sticker (1929); Smith (1981); Nutton (2004) 31-32; Wernhard (2004) xxxvi-xxxviii.

²⁶ See, for instance: Ps.-Rufus, *Syn. puls.* 4 (Daremberg–Ruelle 223-225 = frag. 177 von Staden); Marcellinus, *Puls.* ll. 260-267 (= frag. 182 von Staden); von Staden (1989), 276-283.

frequent, or small and weak, and the systole and diastole are equal, while the pulse of those in their prime is the largest, strongest, slowest and rarest. Marcellinus then lists (under the title: τίς ὑφ' ἐκάστης ὥρας τοῦ ἔτους ἀποτελεῖται σφυγμός; ‘Which pulse is caused by each of the seasons?’) the changes of the pulse in the different seasons (ll. 360-367): in the winter, for instance, the pulse becomes smaller, weaker, slower and rarer, and thus similar to the pulse in old age. In the final part of the work (ll. 368-504), Marcellinus lists distinctive types of pulse that have been awarded particular names along the years, and describes them according to the generic qualities he had listed earlier (e.g. size, speed and strength) and according to their particular irregular pattern of strokes, for instance: during the ‘gazelling’ (δορκαδίζων) pulse two strokes are felt during a single diastole.²⁷ He ends the work by requesting that it will not be looked down upon (καταφρονηθήτω) despite its peculiarity (ἰδιοτροπώτερον) (for Hippocrates too, he says, would not look down upon something unusual) and by admitting that while future discoveries may overshadow his own work, they will still not detract from this endeavor of his, since progress in medical research was exhorted by Erasistratus himself (ll. 505-510).

As in the case of the generation, definition and qualities of the pulse, Marcellinus’ exposition of the types of pulse in different natural and pathological conditions is a common feature of Greek and Roman pulse treatises.²⁸ Marcellinus’ work complements or supports evidence concerning these topics and, as noted above, offers unique evidence on Praxagoras and Herophilus. It is, however, particularly his introduction and technical explanation of how to palpate the pulse in practice that set Marcellinus’ work apart from other pulse treatises. Neither Ps.-Galen nor Ps.-Rufus discuss these topics, but more or less plunge straight into the theoretical material.²⁹ Indeed, Galen does stress the importance of theoretical and practical training and discusses some of the practical aspects of the method of palpation, yet such remarks are scattered throughout Galen’s works and are not clearly set out together in one dedicated discussion.³⁰ Galen’s technical instructions on how to actually palpate the pulse, mostly concern the question of the pressure the physician must apply.³¹

²⁷ On these types of pulse, see: Harris (1973), 247-249, 256-257, 260-261, 410-418; von Staden (1989), 286, n. 161. Marcellinus notes that a ‘list’ (κατάλογος) of these types of pulse was prepared by the Herophilean and Archigenean physicians (ll. 368-374).

²⁸ There are some differences between the treatises in presentation, order and content of these theoretical parts, but they cannot be addressed here. To note just two: Marcellinus does not discuss the difference between the pulse and pathological motions such as palpitation and spasm (cf. Ps.-Rufus, *Syn. puls.* 2, Daremberg–Ruelle 220-221; Ps.-Galen, *De puls. ad Anton.* [K. 19.637.18-638.2]); Marcellinus does not explain in detail the physiology of the pulse (cf. Ps.-Rufus’ detailed description: *Syn. puls.* 3, Daremberg–Ruelle 221-223). For a summary of the contents of these treatises, see Harris (1973), 249-266.

²⁹ Ps.-Rufus has a very short proemium of six lines, which only notes that the study of the pulse is essential for achieving a successful therapy and that Aegimius (of Elis) is said to have been the first to write on the topic of pulsation (cf. Marcellinus, *Puls.* 45; and see: Nutton [1996a], *DNP* 1, 320, on Aegimius).

³⁰ See below, sections 3-4.

³¹ See below, n. 52. I do not include under these technicalities the descriptions of what one should actually expect to feel (e.g. that while sensing a “gazelling” pulse one will feel two

The only close parallel to Marcellinus' dedicated exposition of the method of palpation is found at the beginning of the Ps.-Soranus treatise, but Marcellinus' discussion, as we shall see, offers some insights that do not emerge from the Latin treatise.³² This practical section as well as the introduction of Marcellinus' work offer interesting insights not only into the history of pulse examination as a diagnostic method, but also into the broader history of medical practice and the interaction between medical practitioners and their patients and audiences in the Greco-Roman world.³³ And it is to these that we now turn.

3. On the Importance of Long Theoretical and Practical Training

Right at the outset of the treatise Marcellinus stresses that a good and correct application of the theoretical teaching, which leads in turn to a correct inference from the pulse, i.e. a correct diagnosis and prognosis, can be achieved only after long training in both the theory and the practice:³⁴

‘Reason (τὸν λογισμὸν) must be enslaved (δουλεύειν) to the touch [which is performed] through the fingers for a very long time, and at the same time, sense-perception (αἴσθησιν) itself must be ordered by the judgment, and once it is enlightened by it (φῶς ἐκείθεν λαβοῦσαν), the lesson can be taught. And it is necessary, besides, that sense-perception and the mind (νοῦν) have an accurate fellowship (συνοδεῦσαι) with one another as well.’
(Ll. 8-11)

The theoretical knowledge, in other words, is of no use if one does not feel different types of pulse many times. One can learn what the ‘size of the pulse’ or a ‘full pulse’ means in theory, but one will not fully comprehend these terms before actually sensing different kinds of pulse in practice. In order to recognise that one is sensing, for

strokes before the artery contracts, the first being fainter than the second, cf. Marcellinus, *puls.*, ll. 418-423). My focus here is on the actual manner in which the physician must approach the patient whose pulse he is about to palpate and how he performs the palpation itself, rather than on what he is trying to sense while performing it. The latter question was often a matter of great dispute and despite its practical aspect, it was part of the theoretical debate and physiological conceptions on how to call the sensations of the pulsating motion and what these motions convey (e.g. the condition of the vital *dunamis*, the strength or *tonos* of the arteries or of the *pneuma*, etc.).

³² The Ps.-Soranus treatise deserves a dedicated study as well, but this cannot be undertaken here; I discuss salient points in it in the course of my discussion of Marcellinus' work below (see section 4 in particular).

³³ For the evidence on the social and historical contexts of ancient medical practice and writing emerging from Galen's works, see for instance: Asper (2005) and (2007), 304-311, 329-367; Mattern (2008); Gill, Whitmarsh and Wilkins (2009).

³⁴ Cf. Gal. *De diff. puls.* 1.3 (K. 8.500.13-15), *De dign. puls.* 1.1 (K. 8.768-771), for the importance of long training and of combining reason, theoretical knowledge and practical experience in interpreting the pulse; Ps.-Gal., *De puls. ad Anton.* (K. 19.638.16-18), where the mind, νοῦς, and sense-perception, αἴσθησις, are said to be the two means for judging (κριτήρια) the pulse: the former discerns the present and the latter discerns the past and the future (καὶ ἡ μὲν αἴσθησις κρίνει τὰ παρόντα, ὁ δὲ νοῦς τὰ προγεγονότα καὶ τὰ μέλλοντα).

example, a full or a large pulse, one must know what (s)he is looking for (i.e. know the theory), but also have experience of other kinds of pulse with which to compare the pulse (s)he is sensing. (S)he must presumably be guided, moreover, by an experienced physician at first, who will identify it correctly. Thus, while the theory is essential for understanding what is sensed in practice and for acquiring fruitful experience, practical training is itself essential for completing the theoretical training. Touch, Marcellinus tells us, ‘has seen even the hidden more sharply than the physician has and has often predicted what is to come’ (θίξις δὲ ὀξυωπεστέρα ἰητροῦ καὶ τὸ κεκρυμμένον ἐθεάσατο καὶ τὸ μέλλον πολλακίς ἐμαντεύσατο, ll. 19-21) — but it will only see so sharply if it is armed with, or directed by, the correct theoretical and practical training. This work of Marcellinus cannot offer the actual practical training, but by offering a broad, albeit brief, guide for both the theoretical and practical training it can serve as a useful aid for ensuring a fruitful practice.

Marcellinus’ stress on the importance of a long and practical (rather than just theoretical) training seems to be directed first and foremost against professional contemporaries, whom he criticises for making fundamental mistakes due to their incompetence and inexperience. He claims that some examine the pulse at the wrong time, or simply apply the wrong amount of pressure while palpating for too short a time (ll. 128-129, 152, 163-164). He refers to careless physicians who do so while trying to impress lay people with their supposed skill in diagnosing by means of the pulse (ll. 163-164) and laments that only rarely, if at all, can one find someone, ‘who has studied and practiced the inference (σημείωσιν) from the pulse on account of both the experience of the hand and the theory of judgement (διὰ τὴν χειρὸς ἐμπειρίαν καὶ διὰ γνώμης θεωρίαν)’ (ll. 5-7).³⁵

A further target for advocating the importance of long training and practice was a non-professional audience, in particular those who were familiar with the medical writings and discourse, who attended the public demonstrations and debates of the physicians and often fancied themselves if not amateur physicians, then at least, capable of putting the theoretical medical knowledge to practical use.³⁶ Marcellinus refers right at the outset of his work to laymen (ἰδιῶται), who have attempted to either feel their pulse, or to study the pulse theory:

‘There is a great difference between palpating the pulse and learning what is required about the pulse. I do not know whether any one, down even to [mere] lay people (καὶ μέχρι τῶν ἰδιωτῶν), has not dared [to palpate his/her pulse], having acquired the reputation of being a physician or a *philiatros*. And for this reason, this matter (διότι τὸ πρᾶγμα) [*sc.* touching the pulse] does not seem to be anything difficult, [but] possible for anyone.’ (Ll. 1-5)³⁷

The picture emerging from this passage is of a diagnostic *technē* that seems so easy to implement that even those untrained in it believed that they could use it without

³⁵ On this, see also the following section.

³⁶ On this point, see Lewis (forthcoming). On these debates and such laymen, see: Barton (1994) 13-14, 147-49; Asper (2005); Mattern (2008), 48-92.

³⁷ This translation is based on von Staden’s forthcoming edition, in which the text of these lines is improved and completed with the aid of additional manuscripts. My translation has also benefited from von Staden’s translation of this passage.

consulting with a skilled and trained artisan (i.e. a physician). This picture is supported by a passage from Plutarch, who claims that 'no one should be ignorant of the particularities of his own pulse' and that it is 'useful and easy' (ὠφέλιμον καὶ ῥάδιον) to know, without having to turn to a physician, whether one's pulse is, for instance, frequent (πυκνός) or rare (μυρός).³⁸ Thus, it would seem that Marcellinus' emphasis on the need for a long training in the identification and interpretation of the pulse was not meant only as a warning to rival physicians, deemed incompetent by Marcellinus (or a warning to potential patients to avoid such physicians). It was intended also as a warning to those laymen who may think they could easily diagnose their own condition without consulting a physician by simply feeling their pulse and interpreting it in the light of the medical literature available to them, or in the light of their experience as recipients of medical attention or as bystanders during the examination of friends or family members.³⁹ This section constitutes, therefore, an important testimony to ancient patients' awareness of professional medical practices, to the transmission of professional knowledge to lay people and to its filtering into lay medical practice.⁴⁰

4. The Practical Method

From line 114 begins a long section (entitled: 'what is the manner of touching the pulse?' τίς ὁ τρόπος ἐπαφῆς σφυγμοῦ) which we may describe as 'the practicalities of palpating and measuring the pulse'. It begins with an introductory statement on the reason for including such a section and on its importance:

'Many different mistakes have been made due to the inexperience of those incapable of interpreting by touch the precision entailed in pulsation (...). Some of the doctors who happen to be in high repute do not pay attention to the manner in which the motion of the artery must be palpated and do not recognise the unnatural pulse, but think that the natural pulse is unnatural, that the fatal one is not dangerous and that the bad one promises health — being misled entirely about the interpretation by the palpation performed incompetently.' (Ll. 115-123)

The key, therefore, for a correct identification and hence interpretation of the pulse is the correct palpation which will allow the physician to recognise correctly the subtle qualities of the pulse. Nevertheless, according to Marcellinus, even physicians held in high esteem do not perform the palpation properly, which leads them to misinterpret the significance of the motion, i.e. the pulse, which they sense. Thus, for instance, they will not recognise that the pulse they are sensing is in fact a natural pulse — they may feel it as stronger or larger than it actually is and thus deem it unnatural. And if the pulse itself

³⁸ Plut. *De san. tuenda* 26, 136e7-f4.

³⁹ See also Lewis (forthcoming); for the presence of friends and members of the family and household during the physician's examination, see Mattern (2008), 84-86, 88-90.

⁴⁰ Galen too is an indirect source for this transmission of knowledge, through the many anecdotes with which he peppers the patient case-studies that he recounts. For the manner in which such transmission could have taken place and its consequence for the medical theory and practice, as well as for the evidence from Galen on this topic, see Lewis (forthcoming).

is perceived incorrectly, its significance with respect to the patient at hand and his/her condition will be similarly misunderstood.⁴¹

Following this introductory justification and explanation of the importance of knowing the correct way of palpating the pulse, Marcellinus explains the actual method to do so.⁴² He discusses several points: at what stage of the medical examination of the patient the pulse must be taken; what further information about the history of the patient's disease is required; what part of the patient's body must be palpated in order to feel the pulse; the degree of pressure to be applied; the number of fingers to be used; the duration of the palpation.

The first topic he addresses is the timing of the examination of the pulse in the course of the physician's general examination of the patient. It is here that much interesting information comes to the fore, and it is worth citing these passages in full:

‘It is, therefore, necessary that the [physician] entering the patient's [room] will not extend his hand immediately to the pulse. First, because one must deem indecent and clownish the attending physician who immediately palpates the pulse. Second, it is likely that [the physician] approaching the patient with haste — something that happens regularly — will apply [his] touch to a *pneuma* that is still troubled and unsettled.⁴³ In addition, the pulse of the sick person undergoes some change and alteration especially in anticipation of the physician's entrance, either because (s)he is rejoicing, in the hope of a swift recovery, in particular if it is a very skilled physician [who is arriving], or because (s)he is frightened of hearing from the physician something bad concerning death. And awe and fear alter the pulse of the sick in expectance of the [physician's] arrival, when a physician who is revered and very respectable enters into the presence of children, girls or women, who were not previously accustomed to be seen in their private life, or to be repeatedly questioned about it.

On account of these and similar factors it is necessary not to palpate the pulse straight away, that is, immediately upon arrival, but to learn about the disease — in particular from the patient himself, if he is of sound mind, or even from family members. [The physician should enquire, for instance]: on account of which cause the disease arose, about the number of days [*sc.* the duration of the illness] and about the paroxysms and remissions [which occurred] in the disease, as well as whether there were any secretions.

⁴¹ Cf. Gal. *Praecog.* 14.3-5 (K. 14.670-671 = Nutton, CMG V, 8, 1, 138-140) for the criticism of such mistakes made by other physicians.

⁴² Cf. Ps.-Soranus, *Puls.* Rose 275,1-2, where the author states that he will first explain the method of examination because mistakes are made by those who are ignorant (*nescientes*) about the manner of palpating the pulse.

⁴³ In antiquity, it was *pneuma* rather than blood that was thought to be drawn into the heart and arteries and expelled from them during their expansion and contraction. Marcellinus' reference to a disruption in the *pneuma* rather than in the coats of the arteries or in their pulsating activity (*energeia*) or capacity (*dunamis*) points to a physiological conception of the pulse associated most prominently with Erasistratus and refuted by Galen, namely, that the arteries pulsate as a consequence of a flow of air, which is pushed from the heart and causes them to expand (rather than believing that the arteries expand and consequently draw in *pneuma* due to a particular capacity of their walls), see, for instance: Gal. *De diff. puls.* 3.2, 4.2 (K. 8.646.5-9, 8.703.4-9 = frags. 110-111 Garofalo; Wilson (1959), 303-304; Lewis (2014), 172, 176-178, 180.

For these things, too, contribute greatly to the accurate interpretation. And the pulse is entirely restored once it is moved only by the disease itself [*sc.* not by fear or excitement].’ (Ll. 124-146)

Several interesting points emerge from this passage — not only about the examination of the pulse, but also about the course of medical examination in general, the relation between the physicians and their patients, and the physicians’ sensitivity to the difference between patients of different age and gender. The plea to avoid palpating the pulse immediately upon the physician’s arrival and encounter with the patient is found neither in Galen’s treatises nor in the Ps.-Galen and Ps.-Rufus treatises. Moreover, although the Ps.-Soranus author does prescribe chatting and questioning the patient before examining the pulse, he does not explicitly say that this delay is intended to ensure that at the time of palpation the patient’s pulse is unaffected by the physician’s arrival and the patient’s expectations and fears. True, he notes that this delay will allow patients who are agitated on account of the physician’s presence, or who have just woken up, to regain their composure (*se recomponere*) and will also allow the weary physician to rest from the efforts of his profession. He does not mention, however, the effects of such agitation on the pulse, or that the pulse needs to calm down from such agitation.⁴⁴ Besides Marcellinus, the only other author who makes an explicit connection between the delay in the pulse examination and the need to calm the patient’s pulse is Celsus, who was not himself a physician, but who discussed medical practice and theory in detail in his work *On Medicine (De medicina)*. In his discussion of fevers, Celsus refers to the difficulties and challenges posed by the pulse, which, he says, was the main tool used by physicians to determine the stage of the patient’s fever (which in turn determined the recommended therapeutic regimen); it is here that he remarks that:

‘The bath and exercise and fear and anger and any other affection of the mind often move the vessels; so that when the physician first arrives, the solicitude of the patient, who is wondering how the physician will assess his condition, may disturb the vessels [*sc.* the pulse]. For this reason, experienced (*periti*) physicians do not seize the patient’s arm with their hand as soon as they arrive, but first sit down and with a cheerful countenance (*hilari vultu*) ask how the patient finds himself; and if the patient has any fear, they calm him with pleasant talk (*probabili sermone*), and only after that do they move their hand to touch the patient.’⁴⁵

⁴⁴ Ps.-Soranus *Puls.* Rose 275,19-276,1. He presumably also believed that the information gleaned from the patient’s answers is of importance in interpreting the physical symptoms such as the pulse, complexion, pains etc. (cf. Marcellinus, *Puls.* ll. 144-145; Gal. *Syn. libr. de puls.* 16 [K. 9.474-476]). The Ps.-Soranus author notes that the physician must also prepare his own hand for the palpation, namely, by assuring that it is neither too hot nor too cold, for this may distort his diagnostic interpretation. He seems to have thought that this too could be done during the questioning preceding the palpation of the pulse (Ps.-Soranus, *Puls.*, Rose 276,1-7). For the idea of a “hot pulse” and “cold pulse”, cf. Ps.-Gal. *Med. Def.* 212 (K. 19.405).

⁴⁵ Cels. 3.6.6 (translated by Spencer with modifications). Galen mentions the effects of fear and agitation on the patient’s pulse in his exposition of the effects of emotions on the pulse (e.g. *De caus. puls.* 4.5 [K. 9.160-161]). Elsewhere (e.g. Gal. *De praesag. ex puls.* 1.4 [K. 9.249-251]) he cautions against trusting the pulse indicative of fear immediately, since it may be misleading under certain circumstances, but he does not recommend to wait until the

In this passage from Celsus, the reason given for delaying the examination of the pulse concerns the consequences for the diagnosis: the patient might be excited or agitated at the beginning of the encounter and such states of mind may alter the pulse and, as a consequence, the physician will be sensing a pulse generated not (only) by the pathological condition he is attempting to diagnose, but by the patient's temporary emotional state. Thus, even if the physician performs the palpation correctly and even draws the correct conclusions from the pulse he had felt, these conclusions will be mistaken as far as the patient's pathological condition is concerned.

We have seen that Marcellinus too connects between the timing of the palpation of the patient's pulse and the accuracy of the diagnosis. Marcellinus first mentions, however, an entirely different reason for delaying the examination of the pulse, which concerns not the consequences for the medical diagnosis, but the implications for the physicians' reputation and image: a physician palpating the patient's pulse right upon arrival is deemed 'indecent and clownish'. This reasoning is unique to Marcellinus and is not mentioned by any of our sources. It may have been, perhaps, a response to the fact (attested in non-medical sources) that the gesture of palpating the pulse had become a popular and at times satirical means for indicating a sick person and his/her need for the physician.⁴⁶ The examination of the pulse and the unique palpation it entailed had become a symbol for the medical profession and its practitioners. Medical and non-medical sources indicate, moreover, that this method had come to be considered by physicians as well as by lay people as the primary part of the medical examination — in both time and importance.⁴⁷ No wonder, therefore, that it became a means for physicians to 'show off' their skills, as Marcellinus tells us (ll. 163-164).⁴⁸

The passage cited above (p. 205) from Marcellinus offers a glimpse of the physicians' concern with their image and of the deontological aspect of the ancient practice of taking the pulse of patients. It is particularly interesting that it attests not only to the physicians' wish to appear decent and dignified, but also to the attention given (at least in theory) by ancient physicians to the need to generate a comfortable atmosphere during the encounter with patients and to their awareness of their patients' fears and expectations in face of disease and the encounter with their physician. It also attests to

patient is calmer, or to delay the examination of the pulse until the patient's pulse has settled.

⁴⁶ See, for instance: Quint. *Inst.* 11.3.88, where the mimicking of a physician palpating the pulse in order to evoke the image of a sick man is the first example for gestures that 'indicate things by means of mimicry' (*res imitatione significant*) just like the image of a cithara player is evoked by 'moving the hands as though they were plucking the strings'; and Persius, 3.107 for a satirical character urging the doctor to touch his heart and vessels in order to determine if he is ill.

⁴⁷ Galen tells us of patients who entreated him to take their pulse as soon as they encountered him and then eagerly asked for his verdict (Gal. *Praecogn.* 2.5 and 3.11 [K. 14. 607 and 616-17 = Nutton, CMG V,8, 1, 76 and 86]). Seneca the Younger (first century AD) notes that in order to advise about the appropriate time for eating or bathing, the physician 'must touch the vessels [*sc.* the pulse]' (*vena tangenda est*) (Sen. *Ep.* 22).

⁴⁸ For this passage, see below, p. 209.

the physicians' sensitivity in the case of female and young patients, for whom the intimacy involved in the medical examination was particularly unusual and unnerving.

Of course, the sensitivity to and care for the comfort of the patient during the examination were motivated, as we have seen, also by the need for a successful diagnosis. Examining an agitated patient may distort the symptoms and hence the diagnosis and, consequently, undermine the physician's success and harm his reputation. But this may be said about many other deontological guidelines in ancient sources, which stress, for instance, the importance of cheering up the patient in order to assist the treatment or of postponing the discussion of the physician's fee until after the treatment, so as to avoid agitating the patient.⁴⁹ Even if this was indeed the main or even the only true motivation for such considerations, these passages in Marcellinus are still important evidence for the ideal course of the medical examination (greeting the patient, holding a mundane chat, questioning him/her and those close to him/her and then performing the physical examination) and for the ancient physicians' perception of their patients' feelings and expectations.

After explaining at what stage of the encounter with the patient the physician should reach out and measure the pulse, Marcellinus turns to explain how this measuring should actually be performed in order to ensure as precise and reliable a perception of the motion as possible. He first describes where and how the physician must position his and the patient's hands, and then the manner in which the fingers should actually palpate. We learn that the physician must examine the pulse in both the patient's arms because some people might have a different pulse in each arm, and that the arms must rest upon something and not be raised in the air because this would affect the pulse. The physician should use his right hand and not encircle the patient's wrist, but palpate in the place in which the arterial motion is apparent and clearly marked out.⁵⁰

The palpation should be performed by pressing down three or four fingers with measured pressure for the duration of at least ten beats, thus enabling the physician to identify the various qualities and any anomalies.⁵¹ The matter of the degree of pressure to be applied is particularly stressed by Marcellinus. He mentions it briefly at the beginning of this practical section (ll. 123-124) and then addresses it in detail shortly after:⁵²

⁴⁹ [Hipp.], *Decent.* 16 (L. 9.242); *Praec.* 4, 6 (L. 9.254-256).

⁵⁰ Ll. 146-151. Galen (*De puls. ad tir.* 1 [K. 8.454]) lists the places for palpating the pulse (e.g. the temples, the instep of the foot, the stomach) according to the degree to which the pulse is perceptible in them; he deems the wrist the preferable place, because it is fleshless, the arteries in it run in a straight line and it does not require removing any of the patient's clothes.

⁵¹ Ll. 151-154.

⁵² The amount of pressure one must apply is addressed briefly also by the Ps.-Soranus author (Rose 276,12). It is discussed in detail by Galen (*De dign. puls.* 1.7 [K. 8.803-806]; *Syn. libr. de puls.* 7 [K. 9.447-450]), but mostly with reference to the finesse required for sensing the evasive systole (i.e. the contraction of the arteries) and the pauses between diastole and systole: applying too little or too much pressure will not allow the physician to feel the systole or pauses and will thus distort the identification and interpretation of the pulse. On the debate on the perceptibility of the systole, see Gal. *Syn. libr. de puls.* 5 (K. 9.443-444), as well as Harris (1973), 402-403, and von Staden (1989), 272-273, for discussion.

‘One must palpate neither lightly, nor squeeze the artery too much, but apply a measured [degree of] pressure. Thus the perception of the motion will be accurate, and it is possible for those palpating to ascertain the dimensions, strengths, speeds and slowness, as well as all the other combinations occurring in the pulse (τὰς κατὰ τὸν σφυγμὸν συμφωνίας).’ (Ll. 155-159)

The reason why the duration of the palpation is so important is explained as well:

‘It is necessary, therefore, to palpate for a length of time, so that we shall perceive both these [*sc.* the uneven, irregular, intermittent and recurrent types of pulse] and the other peculiarities of the pulse and thus the interpretations [from the pulse] may progress and be safe for the afflicted, being dictated (ὑπαγορευόμενοι) by the actual interpretation of the pulse to those who have studied (τοῖς μεμαθηκόσι) [the art].’ (Ll. 169-171)⁵³

All these instructions are presented matter-of-factly, with hardly any polemical digressions, certainly not of the kind we find in abundance in Galen and which consist of numerous examples and anecdotes about cases in which others had performed the palpation incorrectly and thus offered a wrong diagnosis. While such remarks by Galen are revealing in many ways, they make it difficult for the reader, whether a student or an experienced physician, to follow the lesson and extract the core of the didactic information. In contrast, on the two occasions on which Marcellinus mentions those palpating the pulse incorrectly, his remarks are brief, to the point, and made almost in passing (the emphasis is my own):

‘[The physician] must certainly not perform the palpation with one finger — *as some do, because of false pretence of experience* — but with four or three fingers, so that the motion of the arteries will be perceived from much pressure applied to many parts [of the artery].’ (Ll. 151-154)

And shortly later:

‘The following must be carefully observed: the palpation must not be withdrawn immediately from the pulse, for instance after the first or second beat, but after a larger [number of beats] — for instance, after the tenth or twelfth [beat], especially in cases in which a bad disposition of the pulse is suspected. Thus, *those who withdraw the palpation [sc. remove their hand] after the first or second beat when they show off their experience and training to laymen are mistaken about the perception* because of what they did not observe, [regardless of] whether [the beat] after which someone palpated the diastole maintained the same distention or not [*sc.* regardless if one had or had not recognised a change already in the second beat], especially since the uneven and irregular [types of pulse], as well as the intermittent and recurrent [types], do not occur [*sc.* do not become apparent] in the first pressure of the touch, but later.’ (Ll. 159-168)

The remarks highlighted in the passages above may have had a rhetorical and even self-approbatory and self-promoting aim, rather than a solely didactic one, but they are not elaborated or emphasised. They do not confuse or distract the audience from the main point, but warn them from such mistakes by means of a general reference to the incompetence of some practitioners. Thus, one reading or listening to this work of Marcellinus, would be warned of the dangers of careless practice, while being able, at the same time, to follow Marcellinus’ train of thought and to easily grasp his instructions.

⁵³ Here too I am indebted to von Staden’s forthcoming edition and his comments.

Note, moreover, that (in stark contrast to Galen's writings) there is no direct self-praise in these passages.

Galen, we have seen, stresses the importance of practical training and experience and explains in detail the degree of pressure to be applied (see above, n. 52). In his four-book treatise *On Diagnosing the Pulse* he also painstakingly describes what one will sense in various types of pulse; but we do not find in any of his treatises a clear and dedicated list of practical guidelines for palpating the pulse. In fact, apart from Marcellinus, only the Ps.-Soranus author clearly describes the method of palpation, although his exposition does not correspond exactly to Marcellinus'. The Ps.-Soranus author begins with the question, which is not discussed by Marcellinus, of where the physician must sit in relation to the patient, so that he will be able to observe the patient easily, while avoiding harmfully agitating him/her (Rose, 275,4-13). He then mentions the timing of the palpation in the general examination, but, as noted above (p. 206), his justification for this is slightly different than Marcellinus' (Rose, 275,14-276,2). Following this he remarks that the physician's hand must be neither cold nor hot while palpating the patient and explains which hand of the patient should be examined — here, too, differing from Marcellinus.⁵⁴ He then briefly remarks that three or four fingers must be used, applying a moderate pressure to the 'top' or 'beginning' (*capita*) of the arteries and kept still, so that the peculiarities of the particular pulse can be perceived.⁵⁵ This is very similar to what we find in Marcellinus, but is much briefer and offers fewer details about the reasons for these instructions.

Conclusion

The aim of this paper has been to bring to light some unique and valuable aspects of Marcellinus' work on the pulse and to examine its contribution to our understanding of the theory and particularly of the practice of the ancient "art of the pulse", as well as to our grasp of the interaction between patients and physicians in antiquity. The paper has shown that Marcellinus' work does not only support and enhance our knowledge of the theoretical framework and debate among physicians, but also offers a rare and enlightening exposition of the practicalities entailed in examining the pulse, as well as a rare non-Galenic exhortation to the importance of practical and theoretical training.

We learn from this treatise that the examination of the pulse required not only practical, but also deontological guidelines. The importance of postponing the palpation

⁵⁴ Ibid. 276,2-11: Marcellinus does not mention the temperature of the hand. In addition, Marcellinus states that the pulse must be examined in both of the patient's arms, whereas Ps.-Soranus says that ideally the right arm should be palpated (although the arm to be palpated in practice should be determined on any given occasion in accordance with the position in which the patient is lying: e.g. if (s)he is lying on his/her side, then the free arm on the other side should be palpated, regardless of whether it is the right or left hand).

⁵⁵ Cf. Galen's reference to palpating the artery ἄνωθεν ('from high above') as opposed to κάτωθεν ('from below, or low down') with respect to the degree of pressure one must apply when palpating the pulse (*De dign. puls.* 1.7 [K. 8.804.5-6]); this refers, presumably, to how far and deep into the flesh the fingers should be pushed, that is, how strongly one must press down upon the artery being palpated.

of the patient's pulse is explained not only by the possible consequences of a premature palpation to the diagnosis and prognosis (as attested by Celsus as well), but also by the need to maintain the physician's dignity in the eyes of the patients. This also complements evidence from non-medical sources about the popular perception of the medical practice of palpating the pulse as a crucial, but at times exaggerated or satirical, part of the medical examination and profession. In this context Marcellinus also testifies to the ancient physicians' concern with assuring their patients' comfort and to their understanding of its importance for their own success, as well as to their opinion that female and young patients required a more careful and delicate handling. From his discussion we also learn about the ideal course of the medical examination and the encounter between physician and patient, namely, performing the physical examination only after talking and calming the patient and gathering further information that can assist the establishment of a correct diagnosis and prognosis. We have seen too that Marcellinus' work attests to the interest of lay people in the theory and practice concerning the pulse and to the filtering of relevant information through to them, as well as to the physicians' attempts to maintain their authority in face of such transmission of professional knowledge.

Furthermore, this work reveals the technical details of how ancient physicians palpated the pulse of their patients, details that are only rarely or disjointedly found in other sources: details about the way in which physicians palpated the patients and about their awareness of the importance of the pressure, location and duration of the palpation. We learn, in addition, that these guidelines were not always followed and this was probably one of the main reasons that had led Marcellinus to expound on the method and guidelines in detail.

We can only speculate on the reasons for the absence of such dedicated practical expositions in Ps.-Rufus, Ps.-Galen and Galen himself, but the fact is that two independent authors saw fit to include such information in their works alongside the theoretical teaching. This, in itself, testifies to a lively and dynamic practice and implies that there was a requirement among their contemporaries for concise, "user-friendly" and practical handbooks, which summarise not only the theoretical material, but also the practical method. If for Marcellinus' ancient audience his work offered a handy didactic or reference tool, for the modern historian it offers valuable historical information on the theory and practice of the ancient "art of the pulse". Further research into Marcellinus' work and the other treatises on the pulse will contribute more to our understanding of this rich and lively medical debate and practice.

Bibliography

Editions and Translations

- Celsus. *On Medicine. (Cels.)*. Trans. W.G. Spencer. (1935). Cambridge, MA - London: Harvard University Press.
- Erasistratus. *Fragments*. Ed. I. Garofalo. (1988). *Erasistrati Fragmenta*. Pisa: Giardini.
- Galen. *On Distinguishing the Pulse. (De dign. puls.)*. Ed. C.G. Kühn. Vol. 8. (1824) Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- Galen. *On Prognosis. (Praecogn.)*. Ed. V. Nutton. CMG V ,8, 1. (1979). Berlin: Akademie-Verlag.
- Galen. *On Prognosis from Pulse. (De praesag. ex puls.)*. Ed. C.G. Kühn. Vol. 9. (1825). Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- Galen. *On the Causes of the Pulse. (De caus. puls.)*. Ed. C.G. Kühn. Vol. 9. (1825). Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- Galen. *On the Differences of the Pulse. (De diff. puls.)*. Ed. C.G. Kühn. Vol. 8. (1824). Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- Galen. *On the Pulse for Beginners. (De puls. ad tir.)*. Ed. C.G. Kühn. Vol. 8. (1824). Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- Galen. *Synopsis of his Own Books on the Pulse. (Syn. lib. de puls.)*. Ed. C.G. Kühn. Vol. 9. (1825). Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- Pseudo-Galen. *On the Pulse to Antonius, Eager Student and Philosopher. (De puls. ad Anton.)*. Ed. C.G. Kühn. Vol. 19. (1830). Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- Pseudo-Galen. *Medical Definitions. (Med. def.)*. Ed. C.G. Kühn. Vol. 19. (1830) Leipzig: Prostat in officina libraria Car. Cnoblochii (reprint Cambridge: Cambridge University Press, 2011).
- [Hippocrates]. *Decorum. (Decent.)*. Ed. É. Littré. (1861). Vol. 9. Paris: J.B. Baillière.
- [Hippocrates]. *Praecepts. (Praec.)*. Ed. É. Littré. (1861). Vol. 9. Paris: J.B. Baillière.
- Herophilus. *Fragments*. Ed. H. von Staden. (1989). *Herophilus: the Art of Medicine in Early Alexandria*. Cambridge: Cambridge University Press.
- Marcellinus. *On Pulse. (Puls.)*. Ed. H. Schöne. (1907). “Markellinos' Pulslehre”. Ein griechisches Anekdoton'. *Festschrift zur 49. Versammlung deutscher Philologen Schulmänner*. Basel: Emil Birkhäuser, 448-472.
- Persius. *Satires*. Ed. G.G. Ramsay. (1918). Cambridge, MA - London: Harvard University Press (reprint 1961).
- Plutarch. *On the Perservation of Health. (De san. tuenda)*. Ed. J. Defradas, J. Hani, R. Klaerr. (1985). Paris: Les Belles Lettres.
- Quintilian. *Institutes of Oratory. (Inst.)*. Ed. C. Halm. (1868). Leipzig: Teubner.

- Ps.-Rufus of Ephesus. *Synopsis on Pulse*. (*Syn. puls.*). Ed. C. Daremberg, C.E. Ruelle. (1879). *Oeuvres de Rufus d'Éphèse*. Paris: Impr. nationale.
- Seneca. *Letters to Lucilius*. (*Ep.*). Ed. F. Prechac. (1985). Paris: Les Belles Lettres.
- Ps.-Soranus. *On Pulse*. (*Puls.*). Ed. V. Rose. (1963). *Anecdota Graeca et Graecolatina*. Vol. 2. Amsterdam: Hakkert.

Studies

- Asper, M. (2007). *Griechische Wissenschaftstexte. Formen, Funktionen, Differenzierungsgeschichten*. Stuttgart: Steiner.
- Asper, M. (2005). 'Un personaggio in cerca di lettore: Galens *Großer Puls* und die ‚Erfindung‘ des Lesers, in: T. Fögen (ed.), *Ancient Technical Texts*. Berlin: De Gruyter, 21-39.
- Barton, T. (1994). *Power and Knowledge: Astrology, Physiognomics, and Medicine under the Roman Empire*. Ann Arbor: University of Michigan Press.
- Berrey, M. (2014). 'Chrysippus of Cnidus: Medical Doxography and Hellenistic Monarchies'. *Greek, Roman, and Byzantine Studies*, 54.3, 420-443.
- Berrey, M. (2011). *Science and Intertext: Methodological Change and Continuity in Hellenistic Science*. D.Phil., University of Texas, Austin.
- Campos, L.M.P. (2006). 'Observaciones al tratado de Galeno acerca de la Diferencia de los Pulsos', *Fortunatae* 17, 99-115.
- Duminil, M-P. (1983). *Le sang, les vaisseaux, le coeur dans la Collection Hippocratique*. Paris: Les Belles Lettres.
- Gill, C., Whitmarsh, T., Wilkins, J. (2009). *Galen and the World of Knowledge*. Cambridge: Cambridge University Press.
- Harris, C.R.S. (1973). *The Heart and the Vascular System in Ancient Greek Medicine – from Alcmaeon to Galen*. Oxford: Oxford University Press.
- Leith, D. (2009). 'Question-Types in Medical Catechisms on Papyrus', in: L. Taub, A. Doody (eds.), *Authorial Voices in Greco-Roman Technical Writing*. Trier: Wissenschaftlicher Verlag, 107-123.
- Lewis, O. (forthcoming). 'The Practical Application of Ancient "Pulse-Lore" and its Influence on the Patient-Doctor Interaction', in: G. Petridou, C. Thumiger (eds.), *Approaches to the Patient in the Ancient World*, Leiden: Brill.
- Lewis, O. (2014). *Praxagoras of Cos on Pulse, Pneuma and Arteries and His Role in the Development of Ancient Medicine*. D.Phil., Humboldt-Universität zu Berlin, Berlin.
- Mattern, S.P. (2008). *Galen and the Rhetoric of Healing*. Baltimore: The John Hopkins University Press.
- Mavroudis, A. (2000). *Ἀρχιγένης Φιλίππου Ἀπαμεύς. Ὁ βίος καὶ τὰ ἔργα ἐνὸς Ἑλλήνα γιατροῦ στὴν αὐτοκρατορική Ρώμη*. Athens: Academy of Athens.
- Nutton, V. (2004). *Ancient Medicine*, London - New York: Routledge.
- Nutton, V. (1999). 'Marcellinos (1)', *DNP* 7, cols. 913-914.
- Nutton, V. (1996a). 'Aegimius (3)', *DNP* 1, col. 320.
- Nutton, V. (1996b). 'Archigenes of Apamea', *DNP* 1, col. 993.
- Schöne, H. (1907). 'Markellinos' Pulslehre. Ein griechisches Anekdoton' in: *Festschrift zur 49. Versammlung deutscher Philologen Schulmänner*. Basel: Birkhäuser, 448-472.

- Smith, W.D. (1981). 'Implicit fever theory in Epidemics 5 and 7', *Medical History Suppl.* 1, 1-18.
- Von Staden, H. (1989). *Herophilus: The Art of Medicine in Early Alexandria*. Cambridge: Cambridge University Press.
- Sticker, G. (1929). 'Fieber und Entzündung bei den Hippokratikern', *Archiv für Geschichte der Medizin* 20.2, 150-174.
- Wellmann, M. (1895a). *Die pneumatische Schule bis auf Archigenes*. Berlin: Weidmannsche Buchhandlung.
- Wellmann, M. (1895b). 'Archigenes', *RE* 2.1, cols. 484-486.
- Wernhard, M. (2004). *Über die Arten der Fieber in der arabischen Version des Hunain ibn Ishāq*. D.Phil., Ludwig-Maximilians-Universität, München.
- Wilson, L.G. (1959). 'Erasistratus, Galen, and the *Pneuma*', *Bulletin of the History of Medicine* 33.4, 293-314.

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