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## ANATOMICAL ADJECTIVES WITH THE COMPONENTS –*IDEUS* AND –*FORMIS*

*This contribution presents some observations on the expression of formal similarity in anatomical nomenclature using composite adjectives with the specific feature of the suffixes –eides, es (in the latinized version –ideus, a, um) and –formis, e. Using selected, terminologically interesting documents, the significant changes and modifications are pointed out, which the terms in this distinct and homogeneous group have undergone in the course of their development from ancient times to the present. Whereas the majority of adjectives with the suffix –ideus, which predominate in the terminological sets, have their origin in ancient Greek, the Latin component –formis started being used in the terminology in the modern age, and its productivity is much lower.*

**Keywords:** Terminology of anatomy; history; adjectives; expressing of shape.

The custom of naming an anatomical feature with a term, whose substantive basis is specified by an adjective expressing the formal similarity of this feature with some other object, is as old as ancient Greek medicine itself. Such analogies can be found in the Hippocratic Corpus, even though this compilation contains relatively few anatomically-themed texts. In the treatise *De corde* we learn that: *Καρδίη σχῆμα μὲν ὀκκοίη πυραμίδος,*<sup>1</sup> i.e. that the heart is shaped like a pyramid or that a chamber of the heart *τὸ εἶδος εἴκελον ὄλμου,*<sup>2</sup> i.e. it is similar in appearance to a mortar.

The ideal way of capturing the likeness appears in classical Greek as a composite adjective with the specific feature of the suffix –*ειδής*, *ές*, derived from the Greek word *εἶδος*, meaning likeness or form. Well known for its composites, Greek makes frequent use of this word-forming ap-

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<sup>1</sup> HP. *Cord.* IX 80 L.

<sup>2</sup> HP. *Cord.* IX 84 L.

proach, which later spread into modern languages. This component is now perceived in the form *-ideus* and termed as a suffix, more precisely a suffix-oid. Plato for instance uses the adjective *ἀεροειδής, ἔς*,<sup>3</sup> meaning air-like, and Aristotle has *κυνοειδής, ἔς*,<sup>4</sup> dog-like. In medical terminology too, especially in anatomy, analogical expressions often occurred, because they were particularly appropriate for their semantic clarity. Hippocrates uses for example the adjective *ἀραχνοειδής, ἔς*,<sup>5</sup> spider-like or cobweb-like, though not in an anatomical context, because here the appearance of urine is compared to a cobweb; and elsewhere there is the adjective *σφαιροειδής, ἔς*,<sup>6</sup> ball-like, indicating the shape of the head of Asian peoples.

An excellent example of precisely this kind of simile expressed through the use of adjectives with the suffix *-ειδής, ἔς* is the passage in the work by Rhuphos of Ephesos *De corporis humani appellationibus*, which concerns the composition of the eye: *Τῶν δὲ τοῦ ὀφθαλμοῦ χιτώνων, ὁ μὲν πρῶτος ἐν τοῖς ἐπιφανέσιν ὠνόμασται κερατοειδής. οἱ δὲ ἄλλοι, ὁ μὲν δεύτερος, ράγοειδής, καὶ χοριοειδής. τὸ μὲν ὑποκείμενον αὐτῶ τῷ κερατοειδεῖ, ράγοειδής, ὅτι ἔοικε ῥαγὶ τῇ ἔξωθεν λειότητι, καὶ τῇ ἔσωθεν δασύτητι. τὸ δὲ ὑπὸ τῷ λευκῷ, χοριοειδής, ὅτι κατάφλεβόν ἐστι τῷ περὶ τῷ ἐμβρύῳ περικειμένῳ χοριοειδεῖ εἰκόσ. ὁ δὲ τρίτος περιέχει μὲν ὑαλοειδὲς ὑγρὸν. καλεῖται δὲ ἀρχαῖον ὄνομα ἀραχνοειδής διὰ λεπτότητα. ἐπειδὴ δὲ Ἡρόφιλος εἰκάζει αὐτὸν ἀμφιβλήστρω ἀνασπασμένῳ, ἔνιοι καὶ ἀμφιβληστροειδῆ καλοῦσιν. ἄλλοι δὲ καὶ ὑαλοειδῆ ἀπὸ τοῦ ὑγροῦ. ὁ δὲ τέταρτος περιέχει μὲν τὸ κρυσταλλοειδὲς ὑγρὸν, ἀνώνυμος δὲ ὦν ἐξ ἀρχῆς, ὕστερον φακοειδής μὲν διὰ τὸ σχῆμα, κρυσταλλοειδής δὲ διὰ τὸ ὑγρὸν ὠνομάσθη,<sup>7</sup> i.e. The layer of the eye which we see first is called the cornea (horn-like), the second is the sclera, described here as “grape-like”, and then the choroid. The sclera lies below the cornea, and it is called “grape-like” because its outer smoothness and inner hardness are reminiscent of a grape. The layer below the white sclera is known as the choroid, because it is similar to the chorion, the membrane surrounding the embryo. The third layer contains glass-like moisture, but the ancients named it “cobweb-like” (arachnoidea) due to its softness. Herophilos compares it to a stretched-out fishing-net, and some even call it “net-like” (the retina), while others say “glass-like” (vitreous body) because of its moisture. The fourth layer has*

<sup>3</sup> PL. *Ti.* 78 C.

<sup>4</sup> ARIST. *HA* 502a.

<sup>5</sup> HP. *Prog.* 12.

<sup>6</sup> HP. *Aër.* 14.

<sup>7</sup> RUF. *De appell. part.* 153.

“ice-like” moisture, and initially it had no name, but later it was called “lentil-like” (the lens) due to its shape, and ice-like due to its moistness.

Galen himself actually mentions similarity as one of the principles for creating nomenclature, albeit in relation to the naming of diseases, but this is the same principle which is applied in anatomical terminology. His view is that names can originate equally well ἀπὸ τῆς πρὸς τι τῶν ἐκτὸς ὁμοιότητος, that is on the basis of similarity with something other than medical.<sup>8</sup>

It can be stated that the ancient Greek anatomists clearly preferred this approach, and created a distinct, semantically homogeneous group of adjectives, which means that the majority of currently-used with the Greek suffix –ειδής, ές, or the latinised –ideus, a, um, less frequently –ides, es, and –idalis, e, come from antiquity. This paper continues with comments on interesting cases and peculiarities of terminology.

The adjective μαστοειδής, ές, *mastoideus* appears as a descriptor for a protuberance for the first time in Galen,<sup>9</sup> but it was used before him by Aristotle,<sup>10</sup> though not in the sense of a process, but to indicate two hard bulges in molluscs which look similar to nipples. Soranos likewise indicates growths in the uterus which resemble nipples.<sup>11</sup>

In describing the laryngeal cartilages, Galen does not use the adjective κρικοειδής, cricoideus.<sup>12</sup> This expression appears in the Pseudo-Galenic treatise *Introductio* indicating a single cartilage.<sup>13</sup> In the modern age it was presented by Du Laurens in 1600, who explains that doctors in ancient times had no name for this cartilage, but more recent ones call it κρικοειδής, i.e. anularis.<sup>14</sup>

An interesting point is that the search of the medical literature connected with the adjectives treated here produced two instances of objections referring to their incorrect form or usage. Rufus of Ephesus points out that the names of the cranial sutures, the στεφανιαία, i.e. *sutura coronalis*, coronal suture, the λαμβδοειδής, i.e. *sutura lambdoidea*, lambdoid suture, and the λεπιδοειδής, i.e. *sutura squamosa*, squamous suture, are not old, but stem ὑπό τινων Αἰγυπτίων ἰατρῶν φάύλως ἔλληνηζόντων,<sup>15</sup> i.e. from cer-

<sup>8</sup> GAL. Meth. med. II, 2 (X, 82 K.).

<sup>9</sup> GAL. UP IX, 20 (III, 937 K.).

<sup>10</sup> ARIST. HA. 529a.

<sup>11</sup> ILBERG (1927: 1, 4).

<sup>12</sup> GAL. UP VII,11 (III, 551-553. K.).

<sup>13</sup> GAL. *Introductio* XIV, 715.

<sup>14</sup> DU LAURENS (1600: 106).

<sup>15</sup> RUF. *De appell. part.* 133.

tain Egyptian doctors who did not speak Greek correctly. Galen mentions in several places the name *στυλοειδής*, i.e. the *processus styloideus*, styloid process, but at the same time he warns that this is the name used by those who speak broken, incorrect Greek (*βαρβαρίζοντες*), and so he would prefer the name *γραφιοειδής* (Gr. *γραφειον*, a graver) or *βελονοειδής* (Gr. *βελόνη*, a spike, needle).<sup>16</sup>

Due to the fact that ancient anatomy was not subject to codification, there still exist anatomical names with specific adjectives which however do not correspond to the state of present-day understanding. This group includes for example *arachnoidea*. According to Celsus Herophilus uses this for the retina,<sup>17</sup> whereas according to Rufus of Ephesus he compares this membrane to a fishing-net (*ἀμφίβληστρον*), and so he calls it *ἀμφίβληστροειδής*. Moreover, Rufus stresses that the third membrane of the eye (the *retina*) is called *ἀρχαῖον ὄνομα ἀραχνοειδής διὰ λεπτότητα*, i.e. by the old name *arachnoidea* due to its tenuity.<sup>18</sup> Galen uses this same adjective in his names for several body features, for small veins,<sup>19</sup> for small nerves,<sup>20</sup> as well as for one of the eye membranes.<sup>21</sup> In the Pseudo-Galenic *Definitiones medicae*, *ἀραχνοειδής* also means a weak pulse.<sup>22</sup> Only in the modern age does this term become limited to the meningeal membrane known as the arachnoid mater. According to Hyrtl, the first to use it in this way was Gerhard Blaes in 1666,<sup>23</sup> when he stated in his work *Anatome medullae spinalis* that the (*tunica*) *arachnoides ob summam subtilitatem et figurae conditionem merito appellanda*.<sup>24</sup>

The adjective *σιγμοειδής*, *ές*, *sigmoideus*, is defined in the Liddell–Scott–Jones dictionary as “of the shape of sigma (C), crescent shape, semicircular”, that is resembling the character sigma, but in the sense of the letter C.<sup>25</sup> Before Galen this word does not appear in the Greek literature, and in Galen it is only found in the sense of semicircular, semilunar. For instance in *De usu partium* he points out expressly that some cartilages are

16 GAL. *UP VII*,19 (III, 592 K.).

17 CELS. *De med.* 7, 13.

18 RUF. *De appell. part.* 154.

19 GAL. *De ven. art. dissect.* 5 (II, 797 K.).

20 GAL. *De anat. admin.* III, 10 (II, 398 K.).

21 GAL. *Meth. med.* I,6 (X,47 K.).

22 PSEUDO-GAL. *Def. med.* 227 (XIX, 411 K.).

23 HYRTL (1880: 47).

24 BLAES (1666: 21).

25 LIDDELL–SCOTT (1996: 1579).

so called after the letter sigma.<sup>26</sup> In *De placitis Hippocratis et Platonis* he uses the identical adjective to indicate the *valvulae semilunares*, the semilunar valves.<sup>27</sup> Vesalius mentions the word *σιγμοειδής* in several places, but explains in every case that the similarity is with the letter C.<sup>28</sup> Colombo does not use *sigmoideus* or *semilunaris*, but chooses the periphrase *quae C a latinis dicuntur*.<sup>29</sup> Although Du Laurens reminds readers that these valves *semicirculi et Lunae falcatae imaginem referunt, Graeci σιγμοειδεῖς vocant*, he himself later uses the expression *membranulae semilunares*.<sup>30</sup> Caspar Bauhin only applies the term *valvula semilunaris*,<sup>31</sup> while Riolan identifies these valves as *sigmoides sive semilunares*.<sup>32</sup> Finally it is worth mentioning Bartholin, who summarizes the naming issue thus: *semicirculum referentes vel lunam, unde semilunares, vel Graecae literae antiquae Sigma, unde Sigmoides dicuntur. Habet vero etiam figuram latinae litterae C*.<sup>33</sup>

The adjectives at issue here with the suffix *-ideus* only rarely started being used in the modern age. For example, classical Greek does not know the expression *κλινοειδής*, *clinoideus*, which is later documented in the commentary by the Byzantine author Eustathios of Thessaloniki (1115–1195/6) on Homer's *Odyssey*.<sup>34</sup> According to Barcia Goyanes, this adjective was first used in the modern era by Sylvius, namely in 1556 in his commentary on Galen's work *De ossibus*.<sup>35</sup> The research for this article produced an even earlier instance, however, paradoxically in the *De corporis humani fabrica*, i.e. the basic anatomical work by Vesalius, who is known for his efforts to put the anatomical nomenclature into Latin form. In his view the *processus clinoidei* are so called because they *inferiorem lecticae mensaeve partem exprimunt*, that is they resemble the Greek *κλίνη*, bed.<sup>36</sup>

It is characteristic of anatomical terminology that not all adjectives indicating similarity through their suffix really have that particular meaning.

26 GAL. *UP VI*, 3 (III, 519 K.).

27 GAL. *De plac. Hip. et Pl. VI*, 6,7.

28 VESALIUS (1555: index s. p.).

29 COLOMBO (1559: 176).

30 DU LAURENS (1600: 470).

31 BAUHIN (1605: 424).

32 RIOLAN (1618: 393).

33 BARTHOLIN (1684: 404).

34 STALLBAUM (1926: 222).

35 BARCIA GOYANES (1979: 368).

36 VESALIUS (1555: 40).

There is a principle which applies here, namely that versions of locally-related terms feature the same epithets. So while the *cartilago thyreoidea* really expresses this cartilage's similarity in shape to a shield, as Galen puts it,<sup>37</sup> the *glandula thyreoidea* on the other hand indicates the localization of this gland in proximity to the thyroid cartilage. This very state of affairs was critically assessed by the famous anatomist J. Hyrtl, who dealt with the suffix *-ideus* in his work *Onomatologia anatomica*. In his opinion, apart from three cases (*rhomboideus*, *trapezoideus*, *deltoideus*), the other adjectives are nonsense, because they do not express similarity at all. For this reason for example, instead of the term *musculus sternocleidomastoideus* he proposes *nutator capitis*, i.e. nodder of the head, or just *nutator*.<sup>38</sup> Hyrtl, however, who had other reservations too about the contemporary nomenclature, found no support for this particular effort.

There are Latin adjectives represented in the anatomical terminology which were formed in an analogous way that is with the ending *-formis*, *e*, derived from the word *forma*, shape or appearance. Such expressions appeared in classical Latin too, although their first part most often has quantitative sense, for example *uniformis*, *biformis*, *triformis*. It is also possible to find combinations with a noun, which the feature in question is supposed to resemble. Horace characterizes the river Aufidus with the composite *tauriformis*, indicating that it resembles (with its mouth) the shape of a bull (with its horns).<sup>39</sup> While adjectives ending in *-ideus* were mostly quite common in ancient texts, those with the ending *-formis* are modern names with modern-day origins. The following commentary focuses on several selected anatomical terms involving adjectival descriptors of this type.

The term *appendix vermiformis*, the Latin name for the “worm-shaped” human appendix, originated progressively. Vesalius stated that the “blind gut”, the *caecum*, is *crassiori lumbrico... simile*,<sup>40</sup> Realdo Colombo used the combination *appendix longiuscula*<sup>41</sup> to refer to it, and Bartholin introduced the worm comparison: *appendicula quaedam parva instar vermis*.<sup>42</sup> It was several years later that Bartholin finally decided for the expression *appendicula vermiformis*.<sup>43</sup>

37 GAL. *UP VII*, 11 (III, 551 K.).

38 HYRTL (1880: 263–265).

39 HOR. *Carm.* 4, 4, 25.

40 VESALIUS (1555: 610).

41 COLOMBO (1559: 228).

42 BARTHOLIN (1651: 67).

43 BARTHOLIN (1684: 82).

The term *os pisiforme*, for the small, “pea-shaped” bone in the wrist, originated according to Winslow from his young German prosector Michael Lyser (1628-1660), who had names available for all the metacarpal bones, among which occurred the name *os pisiforme*.<sup>44</sup>

The adjective *piriformis*, “pear-shaped”, appears according to Barcia Goyanes<sup>45</sup> for the first time in Bauhin in the combination *musculus piriformis*, but with the alternative spelling *pyr-*, that is in the form *pyriformis*. The author names this muscle thus because *pyrum teretem referat*.<sup>46</sup> Not long after this in fact, Riolan comments that the muscle in question *omnium longior pyriformis dicitur*.<sup>47</sup>

It is possible to find instances where the adjectival forms ending in *-ideus* or *-formis* are used as alternates, such as the case of the adjectives *sphenoidalis* and *cuneiformis*. Galen introduced the term τὸ σφηνοειδές ὀστούν, *os sphenoides*, because ὁ ὡσπερ τις σφην ἔγκειται μεταξὺ τῆς κεφαλῆς καὶ τῆς ἄνω γένυος, i.e. it is placed like a wedge between the head and the jaw.<sup>48</sup> In fact the same adjectives can be found even earlier in Theophrastus.<sup>49</sup> The Latin version *os cuneiforme* is used consistently by Vesalius,<sup>50</sup> whereas his successors revert to the Greek name. Colombo for example specifies *σφηνοειδές alio nomine cuneiforme*,<sup>51</sup> while Fallopio exclusively applies the Greek form *σφηνοειδές*.<sup>52</sup>

In the present-day anatomical nomenclature there exist two analogous bones with similar names: *os naviculare*, for the small, “boat-shaped” bone in the foot, and the similar bone in the hand, distinguished as the *os scaphoideum*, which comes from the Greek word meaning “boat-shaped”. The difference lies purely in the languages of origin of the descriptors used. Galen defines the bone in the hand simply with the ordinal number “third”,<sup>53</sup> while for the lower limb bone he applies the name *σκαφοειδές*.<sup>54</sup> Vesalius and his successors continue in this tradition that is they use the appellation

44 WINSLOW (1732: 85).

45 BARCIA GOYANES (1982: 352).

46 BAUHIN (1605: 1192).

47 RIOLAN (1618: 587).

48 GAL. *De ossibus* 3 (II, 747 K.).

49 THPHR. *CP* 1,6,8.

50 VESALIUS (1555: 27).

51 COLOMBO (1559: 24).

52 FALLOPIO (1562: 26b).

53 GAL. *De ossibus* 18 (II, 771 K.).

54 GAL. *De ossibus* 24 (II, 776 K.).

“boat-shaped bone” only for the metatarsal bone. Vesalius lists its various names, *os cymbam scaphamve referens*, *os naviculare*, *naviforme*,<sup>55</sup> and Bartholin provides both, i.e. *os naviculare* and *σκαφοειδές*,<sup>56</sup> as does Eustachius.<sup>57</sup> Castelli’s dictionary contains several variants, *scaphoides*, *os naviculare*, *naviforme*.<sup>58</sup> *Os naviculare*, or more precisely the French forms „os naviculaire“ as well as „scaphoide“, now specifying the metacarpal bone, are registered for the first time in Winslow, again with reference to his prosector Michael Lyser.<sup>59</sup> Later these two names had to be differentiated with the genitive epithets *manus* and *pedis*, i.e. *os naviculare manus* and *os naviculare pedis*. This situation was still maintained in the Jena Nomina Anatomica of 1935, and it was ultimately the Parisiensia Nomina anatomica of 1955 which introduced the differentiation of *os naviculare* for the metatarsal bone and *os scaphoideum* for the metacarpal bone,<sup>60</sup> although paradoxically this was in contradiction with the historical development.

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55 VESALIUS (1555: 208).

56 BARTHOLIN (1684: 753).

57 EUSTACHIUS (1728: 72).

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59 WINSLOW (1732: 269).

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## RÉSUMÉ

Ve starořecké medicíně se anatomické útvary často označovaly termínem, který vyjadřoval podobnost pojmenované formace nějakému předmětu. Ostatně podobnost s věcmi nás obklopujícího světa je zabudována do anatomických termínů i v jiných jazycích. V klasické řečtině sloužilo tomuto účelu kompozitní přídavné jméno s určeným prvkem –*εἰδής*, *ές*, odvozeným z řeckého slova *εἶδος*, podoba, forma. Většina adjektiv se sufixem –*εἰδής*, *ές*, resp. latinizovaným na –*ideus*, *a*, *um*, která se používají v dnešní anatomické nomenklatuře, pochází z antiky. Vedle toho jsou zde zastoupena i latinská adjektiva sestavená analogickým způsobem, a to složkou –*formis*, *e*, odvozenou od slova *forma*, tvar, podoba. Obdobné výrazy se sice vyskytovaly i v klasické latině, ale dnešní anatomické termíny se zmíněnou složkou –*formis* jsou moderní názvy novověkého původu.

