

**Twenty years after, in pursuit of *šer'ānu*:  
From anatomy to pathology through the issue of the pulse.**

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A few years ago, I wrote an article about how difficult it is to categorize an anatomical structure, namely the *šer'ānu*.<sup>1</sup> I was quite a beginner in Assyriological studies, and this anatomical term was not, at that time, studied and commented on as it is now. The title of my article and the medical history journal in which it was published indicated the work of a physician with rudimentary knowledge of Akkadian.<sup>2</sup> I hope I have made some progress in the field and would like to return to my first love and shed new light on this topic.

One of the latest analyses of this part of the body is by Barbara Böck in her book dedicated to Gula,<sup>3</sup> the goddess of healing. She has reviewed the sources concerning *šer'ānu* and the result is largely convincing, as far as it goes. She considers that, “Ancient Mesopotamians had a tripartite concept of human anatomy differentiating between a cord-like system of the body that was visualized as a net, the soft parts of the body, and the skeleton.” (2014, 27). Having this in mind, I will retrace my steps and check what *sa = šer'ānu* actually means in medical texts, given James Kinnier Wilson’s seemingly conclusive statement.<sup>4</sup> After some definitions I will first look at what it means in “ordinary life” texts (as I did in my first article).

**1. It is worth checking the latest translations.**<sup>5</sup>

They reflect the latest developments and understandings of researchers on this anatomical structure. It allows us to hypothesize about the ancient conception of body functioning.

We find the following translations: Mark Geller and Strahil Panayotov 2020 translate *šer'ānu* (SA(-a-nu)) by “sinew/tendon” in BAM 10, 76 (IGI 1: 75’), but by “blood vessel” (206, referring to BAM V 480 i 1). András Bácskay (2018, 279) *šer'ānu* : “vein, artery, sinew”. In

<sup>1</sup> Attia A. 2000, 47-56.

<sup>2</sup> In the jargon of French medical students, “question d’internat” refers to the subjects given during the internship examination and their ideal writing.

<sup>3</sup> Böck B. 2014.

<sup>4</sup> Kinnier Wilson J. 1962, 60 “One thus falls back on the proposition, evidently born in Chicago, that *sa = šer'ānu* means basically ‘veins’ or ‘arteries.’ From their writings it is clear that Oppenheim, Reiner and Landsberger all subscribe to this idea, it is to be found thus translated in not a few passages cited in C.A.D., and it is surely right in a high percentage of cases.”

<sup>5</sup> It may be useful to define the anatomical structures we are dealing with: A **tendon** is a fibrous connective tissue that attaches muscle to bone. Tendons may also attach muscles to structures such as the eyeball. A tendon serves to move the bone or structure. A **ligament** is a fibrous connective tissue that attaches bone to bone and usually serves to hold structures together and keep them stable. (Definitions on MedlinePlus [Internet]. Bethesda (MD): National Library of Medicine (US); [updated Jun 24; cited 2020 Jul 1], available from: <https://medlineplus.gov/>.) **Sinew** has a broad meaning (close to *šer'ānu*!); see on Wiktionary (<https://en.wiktionary.org/wiki/sinew>): “(anatomy) A cord or tendon of the body. A cord or string, particularly (music) as of a musical instrument. (figuratively). Muscular power, muscle; nerve, nervous energy; vigor, vigorous strength. (figuratively, often in the plural) that which gives strength or in which strength consists; (anatomy, obsolete) a nerve.” **Vein**: “A blood vessel that carries blood that is low in oxygen from the body back to the heart. The deoxygenated form of hemoglobin in venous blood makes it appear dark. Veins are part of the afferent wing of the circulatory system, which returns blood to the heart. In contrast, an **artery** is a vessel that carries blood high in oxygen away from the heart to the body.” (<https://www.medicinenet.com/vein/definition.htm>).

AMD 8/4: 132, Greta van Buylaere and Mikko Luukko 2020, summing up the references of the anti-witchcraft corpus and of the *Maqlû* ceremony<sup>6</sup> give *šer'ānu*: “vein, sinew”. Eric Schmidtchen (2021: 666) proposes: “Ader/Blutgefäß; Sehne; (allg.)”.<sup>7</sup> In dictionaries like CAD Š II 308 we find: “sinew, tendon, vein, muscle”, and in AHW 1216 “Band, Ader, Arteries; Sehne, Nerv”. On internet, the translations are more diverse, e.g., in the index of ARMEP (Ancient Records of Middle Eastern Polities)<sup>8</sup>: 1. allocation of work 2. bow string 3. ligament 4. muscle 5. sinew 6. tendon 7. vein. For a modern medical professional “Ader” is problematic. The everyday German language does not differentiate arteries and veins clearly. The word “Ader” has imprecise semantic content, reminiscent of *šer'ānu*.

## 2. Mostly in “ordinary life” texts, *sa = šer'ānu* refers to tendons, ligaments.

This anatomical structure, tendon, ligament or sinew, is a band of fibrous tissue connecting muscle to its bone attachment or a bone to another bone (see note 5). The craftsmen (like carpenters, leather workers, and wheelwrights) were perfectly familiar with it, they used the sinews to tie up and consolidate different objects (sculptures, chariots, furniture, etc.),<sup>9</sup> to make bowstrings,<sup>10</sup> and strings for musical instruments.<sup>11</sup> Temple officials received sinews, among other pieces of butchery, likewise administrative sent to the king “boxes of sinews”.<sup>12</sup> The king, too, was aware of the nature of these sinews.<sup>13</sup> Obviously, the physicians or

<sup>6</sup> Abusch T., Schwemer D. 2011; Abusch T., Schwemer D., Luukko M., van Buylaere G. 2016; Abusch T., Schwemer D., Luukko M., van Buylaere G. 2020; Abusch T., 2016.

<sup>7</sup> Schmidtchen E. 2021, 93-101.

<sup>8</sup> <http://oracc.museum.upenn.edu/armep/>

<sup>9</sup> See sub *šer'ānu* CAD Š II 312, *šašallu* CAD II 169, tendons of the hoof were especially used as strings or ropes.

<sup>10</sup> Ebeling E. 1952, 32-34, lines 11-13 // STT I 19: 79 “Return arrow to your canebrake, frame of the bow to your forest, bowstring to the sheep hoof tendon, feathers to the birds.” Noteworthy the word *matnu* designates the bowstring and the tendon, see CAD M I 412b, BAM II 272: 5 // AMT 73 ii' 7' // LKA 99d ii 4 (šà.zi.ga 64).

BAM II 272:4'-5' <sup>giš</sup>ban(*qaštu*) šá giš.mi(*šilli*)/(<sup>giš</sup>dála in parallel AMT 73/2 ii' 7) [dù<sup>2</sup>]-[uš<sup>2</sup> ...] š[sa péš.ùr].[ral(*arrabu*) ma-ta-an-ša “You make a bow from a spear point or needle. You use an *arrabu*-rodent tendon as its bowstring.” Translation follows Scurlock JA. 2014, 549, see also <http://oracc.org/cams/gkab/P338336> (accessed 20/06/2022). Cf. Zisa G. 2021, 120, 312, E bow ritual: 58-59 and R bow ritual 8'-10' where the tendon used to make the bowstring is the tendon of the left hoof of a gazelle (sa mud maš.dà šá gùb ma-ta-an-[šá ...].

<sup>11</sup> In lexical lists *šer'ānu* (and *gidu* both are words for sinew) are linked with *pitnu* a musical cord (see CAD P 439 sub *pitnu*). In one šà.zi.ga ritual, to combat impotence, the string of the lyre is called *šer'ānu* – sa (Biggs R. 1967, 17, 35).

<sup>12</sup> SAA 19 123 7-15 “(Concerning the *box of sinews* about which my lord wrote to me: ‘Did they give it to you as you had tested?’ – I have brought in the sinews of Digirina. When I come, I will tell my lord what I have tested and sold.” <http://oracc.org/saao/P224497/> accessed 12/11/2021

<sup>13</sup> Sargon II's royal inscription in Khorsabad 043 40-41 “that there will be no interruption in what is desired by the sick, that oil – the pride of mankind that makes (tired) muscles relax – does not become expensive in my land.” <http://oracc.museum.upenn.edu/riao/akk#Q006524.36> (accessed 12/11/2021). In a context of sacrifice in SAA 20 001: 22 “The king [places] a horn of an ox-calf, sinews (of sheep and combustibles on the censers.” <http://oracc.org/saao/P336307/> (accessed 20/06/2022). The same offering is found in SAA 20 002 i 26', SAA 20 009: 27' (<http://oracc.org/saao/P336139/>). Parpola's translation on the website is “muscle”, but probably “sinew” is more likely, as in the following example: a repartition of meat in SAA 12 68: 32 lists these different parts of the sheep: “They shall have the usufruct of the thigh, skins, sinews (<sup>uzu</sup>sa<sup>meš</sup>), and hoof tendons (<sup>uzu</sup>sa-sal-li),” <http://oracc.org/saao/P336318/> accessed 20/06/2022).

exorcists used a sinew as a bag strap or as a thread for amulet necklaces<sup>14</sup> and knew precisely what a “*šer’ānu*” was. This meaning is confirmed by a commentary about *Sakikkū* 12/13 (GCC I 2/406) Vs. 7 (*rik-su-šú ir-mu-ú : ri-ik-su-šú : šér-a-nu-šú*).<sup>15</sup> This word, *riksu*, is a band, a strap (see CAD R 347ff) used to tie up, to reinforce a structure. It is the textile counterpart of the stringy sinew, *šer’ānu*.

In Mari the term *šer’ānu* has passed into the common language as a metaphor for energy, working power, guts; it designates somebody with “strong nerves”.<sup>16</sup> This idiomatic use is to be considered in view of Moshe Held’s interesting article (1965: 395-406). Held analyses the different words for tendon – sinew in Akkadian, and compares their respective uses in economic, literary and medical texts. He points out that in other Semitic languages, words derived from *šer’ānu* refer to blood vessels. Held also defends the idea that these tendons: “in a derived meaning may come to connote ‘strength’” (p. 404) and even “inner-strength, confidence” (p. 406). On the opposite, sorrow can weaken them, as in: Gilg. X v 29 “I filled my sinews with misery *šir’ānīya nissati umtalli*.”

And in the same vein in Old-Babylonian Larsa it appears in administrative documents as a metaphor for work allocation (see <http://oracc.museum.upenn.edu/armep/cbd/akk/SH.html> for several references): e.g., BM 085260 r 5 after a list of workers: “*éren še-we-er-a-nu-um*: troupe, work allocation” then the text ends with the date.

### 3. And for skilled professionals?

**3.1. Lexical lists** provide numerous equivalences leading to correlate *šer’ānu* with tendons/ligaments.<sup>17</sup> Commentaries give similar results. In GCC I 2 406: 7 *rikšusu*, his binding

<sup>14</sup> BAM IV 354 rev. iii 3-4 and 10-11; Schuster-Brandis A. 2008: 127-129; Heeβel N. 2000: 307 (Sagig tablet 28: 3), 319-322 (Sagig tablet 29: 12, 14, 16, 26, 28, 33, 36, 48’, 54’, 61’, 69’). See Zisa G. 2021, 118-119, 235 A.4: 77-78.

<sup>15</sup> See Jiménez E., 2015a, “Commentary on Sagig 13 and 12 (CCP 4.1.13.B),” *Cuneiform Commentaries Project* (E. Frahm, E. Jiménez, M. Frazer, and K. Wagensonner), 2013–2022; accessed November 17, 2022, at <https://ccp.yale.edu/P294665>. DOI: 10079/g1jw6m (accessed 24/06/2022).

<sup>16</sup> See Durand J.-M. 1998, 600 text 797 note b: “il s’agit ici d’une expression figurée ... Les gens n’ont pas assez de ‘tendons’ (cf. l’anglais ‘guts’ dans le même sens) pour supporter la tâche impartie” (cf. *ibidem* 617 texte 806, note b). See also ARCHIBAB (<https://www.archibab.fr/T15388> (accessed 21/08/2022) *sub* AbB 9 216 [MB] Line 6: “Dans les lettres de Mari, le terme est traduit au sens propre ou figuré. Le sens propre ‘tendons, nerfs’ apparaît dans ARM 13 42:8+9+13, ARM 13 56:8, ARM 26/1 266:5’, et le sens figuré apparaît dans ARM 13 124:7’ : *ú-ul ša ši-ir-’a+ni-ia* ‘ils ne sont pas de mes tendons’ = ‘excède mes forces’, et ARM 3 1: 15 : *ú-ul ša še-er-’a+an ši-ip-ri-ia* ‘ils n’ont pas les nerfs que réclame la tâche que j’ai entreprise”. This interpretation is different from the one found in dictionaries or in several authors (see ARCHIBAB, <https://www.archibab.fr/T15494> accessed 21/08/2022): “le CAD Š/2, p. 314b-315a, en fait un terme *šerhānu*, de sens incertain (‘workcrew?’). Le AHW enregistre ce texte (WL p. 43, 2’) à l’entrée *šer’ānu(m)* C ‘ein Leistungspensum (dazu?)’ (1216). S. D. Walters YNER 4 1970, 43 a traduit par ‘he has a *šerhānum*-obligation worth 40 ‘pounds’ of silver’. M. Stol AbB 9 a traduit par ‘he has a force worth 40 minas of silver’”.

<sup>17</sup> See the equivalence between sa-a = sa = *šer’ānu*, *gidu*, *pitnu* sinew, animal sinew, string of a musical instrument Idu II 142ff (*sub pitnu* B, CAD P 439). In the list Nigga: 292-298 it is classified with *še-er-ḥa-nu* (sinew), *qá-lu-u-um* (to burn), *šu-ku-ut-tum* (jewelry), *gi-du-u* (animal sinew), *ma-at-nu* (sinew, bowstring), *we-er-rum* (intestines), *da-mu-um* (blood) and in the OB Nippur Izi tablet II 324-328 *še-er-ḥa-nu* (sinew), *ma-at-nu* (sinew, bowstring), *gi-i-du* (animal sinew), *we-er-rum* (intestines), *[ki]-iš-šum* (bundle). <http://oracc.museum.upenn.edu/dcclt/cbd/akk/M.html> accessed 20/06/2022. This classification must be interpreted with care (what are burning and jewels doing in this mess!). One can also wonder about the reason for including the intestines: is it their shape or the

is equated with *šer'ānušu*, his sinew (binding two bones together or a muscle and a bone.)<sup>18</sup> The same equivalence is found in BM 40939 lower edge 8'.<sup>19</sup> In SpTU 1 7 r 9 *nimšūšu* (his tendons or ligaments) is a synonym of *sa<sup>meš</sup> šer'ānū*.<sup>20</sup> See also BM 40837 (81–4-28,384) (+) BM 41252 (81–4-28,800)<sup>21</sup> where the same equivalence of *šer'ānu* and *nimšu* appears in a context of *šer'ānu* of the temple. What's more, as will be seen later on, the rare words for blood vessels are not equated with any word corresponding to tendon or ligament.

An additional argument seems to come from the milieu of “Mesopotamian scholars.” In the colophons of medical texts, regardless of their category, one can find sometimes the editorial mention of *sur.gibil*. This metaphor refers to the weaving of threads into a fabric.<sup>22</sup> These threads or cords are the pathological signs that the doctor must assemble and put in order to recognise the disease and treat it. Again, strings or bonds<sup>23</sup> serve as a metaphor, not tubes carrying fluid or a pathological element.

The translation of *sa – šer'ānu* is more complex for physicians, exorcists, and diviners. In the medical texts and the physiognomy descriptions, as will be discussed later on, *šer'ānu* corresponds to “tendon” or “ligament” in most cases. A Seleucid commentary from Uruk to *Sakikkū* 14 could even be a definitive argument ending the debate: SpTU 1 36: 12 *ig.lu šer'-a-nu šá an.ta-nu a-si-du*, “*ig.lu* (means) the ligament that is above the heel.”<sup>24</sup> The line is difficult to specify as there is no mention of *ig.lu* in tablet 14, possibly it is located somewhere in a broken part. We learn in the commentary that this *šer'ānu* is situated above the heel (*asīdu*) so we may conclude that a tendon (maybe Achilles tendon) is involved (this tendon also named “heel cord” attaches the calf muscles to the calcaneus bone, see note 5 for tendon definition).

fact that they transport digested food from the stomach to the rectum? Difficult to answer! Similarly, does the presence of blood stem from the existence of “blood guts” or the transport of blood through circulatory vessels? I fear that the interpretation is biased by the personal beliefs of the author of this article or its readers. Other lexical lists (Ura 15 Seg.2.1-13 .1'-3' and BRM 4 35 r 1') enumerates several names of tendons or ligaments, including *manānu* and *šer'ānu*. Unfortunately, the list is badly damaged, which deprives us of many names that would probably have been enlightening.

(<http://oracc.museum.upenn.edu/armep/akk#Q000090.145> accessed 20/06/2022 gives equivalents for *uzu.sa*.)

<sup>18</sup> Jiménez, E., 2015a, “Commentary on Sagig 13 and 12 (CCP 4.1.13.B),” *Cuneiform Commentaries Project* (E. Frahm, E. Jiménez, M. Frazer, and K. Wagensonner), 2013-2022; accessed August 21, 2022, at <https://ccp.yale.edu/P294665>. DOI: 10079/g1jw6m

<sup>19</sup> Jiménez, E., 2015b, “Commentary on Uncertain (CCP 7.2.u43),” *Cuneiform Commentaries Project* (E. Frahm, E. Jiménez, M. Frazer, and K. Wagensonner), 2013-2022; accessed August 21, 2022, at <https://ccp.yale.edu/P461194>. DOI: 10079/18932b9

<sup>20</sup> Cohen, Y., 2016, “Commentary on Šumma immeru, Izbu aḥū (CCP 3.6.3.E),” *Cuneiform Commentaries Project* (E. Frahm, E. Jiménez, M. Frazer, and K. Wagensonner), 2013-2022; accessed August 21, 2022, at <https://ccp.yale.edu/P348493>. DOI: 10079/8pk0pfk.

<sup>21</sup> Jiménez E., Schmidtchen E., 2017, “Two New Commentaries on the Diagnostic Series *Sagig*,” *Die Welt des Orients* 47, 231 r. 13' in a damaged context.

<sup>22</sup> This question has been studied (with previous bibliography) in BAM 9 by Mark Geller (2018, 42-54), Strahil Panayotov (2018, 89-120), Eric Schmidtchen (2018, 137-157), Ulrike Steinert (2018, 167 note 61)

<sup>23</sup> See CAD R sub *riksu* (band, tie, sash, strap): collection or arrangement of tablets.

<sup>24</sup> <http://oracc.org/cams/gkab/P348457> accessed 28/08/2022. See also Wee J. (2019b, 241). This text is a commentary about *Sakikkū* tablet 14. The line is difficult to specify as there is no mention of *ig.lu* in tablet 14, possibly it is located somewhere in a broken part. We learn in the commentary that this *šer'ānu* is situated above the heel (*asīdu*) so we may conclude that a tendon (maybe Achilles tendon) is involved.

**3.2. During hepatoscopy,** *šer'ânu*-structures can be visible on the surface of the gallbladder, heart, or kidneys. References can be found in CAD Š 2 312a 1g. They are difficult to interpret e.g. YOS 10 31 iv 39. *šum-[ma] [mar-tum]* <sup>40</sup> *še-er-ha-[ni]* <sup>41</sup> *ud-du-ha-[at]* “if the gallbladder is covered by *šer'ânu*.” This structure can be one of the ligaments that attach the liver or the gallbladder. It can also be the cystic duct or small blood vessels.

YOS 10 42 i 14 *šumma* (maš) *li-bu še-er-ha-[nu]-šu da-ma-am* <sup>15</sup> *[lu]-[up]-pu-tu*: “if the heart, his *šer'ânu* is smeared with blood.” This tablet begins with description of anomalies observed in the thorax at the level of the heart. This description is odd; there is nothing wrong with the heart and its surroundings being smeared with blood. It is impossible to decide if the haruspices described blood vessels or ligaments attaching the pericardia to the diaphragm.

The same type of problem arises for the kidney in KAR 152 r 11 be éllag zag sa<sup>meš</sup> *ne-ta-at* “if the right kidney is surrounded by *šer'ânu*” ligament or blood vessels can be involved.

**3.3. A medical text brings other arguments and options: *šer'ânu* could also be nerve.**

CT 23/12: 42-44 [*epištu*]<sup>25</sup> *šumma šêp marši ša imitti šer'ân pêmi immeri ša imitti šumma šêp marši ša šumêli šer'ân pêmi immeri ša šumêli teleqqe itqa hurâpi u hurâpti tašammi x kišrî takaššar êma takaššaru šipta tamannu tarakassu*. “its [medical application]: you take, if it is the patient’s right foot, the string from the right side of a sheep, if it is the the patient’s left foot, the string from the left side of a sheep, you intertwine tuft of wool of a lamb and a she-lamb, you tie X knots, each time you tie a knot, you recite the incantation, you fix for him.”

It is rather tempting to consider that the “string” or the “cord” of the thigh is a nerve (sciatic or crural). The sciatic nerve is the most significant and longest in the body. Both nerves are easy to find and remove.

Another attestation in a text describing the fabrication of a *lilissu*-drum leads to the same identification of *šer'ânu* with a nerve of the thigh: Thureau-Dangin F. (1921: 14), AO. 9479 ii 30 *ina sa(šer'ân) gùb šá* <sup>uzi</sup>giš.kun(*rapašti*) *ba-ab-šú ta-šap-pi* “with a string of his (bull) thigh you fasten his (*lilissu*-drum) opening.”<sup>26</sup>

**3.4. As a cord-like structure: is *šer'ânu* a blood vessel? Muscle?**

In a first approach, *šer'ânu* designates tendons/sinews, ligaments, and, as we just saw, nerves. The problem is that there is no visible cordlike sinew or nerve on the temple (this is also true for other body parts: the forehead, earlobes, eyeball, nose, belly, and pregnant woman’s breasts).<sup>27</sup> There are also abnormalities that cannot be reconciled with the appearance of

<sup>25</sup> The beginning is broken, as the tablet lists incantations and rituals for *sagallu*, it is probable that *dù.dù.bi* hides itself in the break. [*dù.dù.b*]<sup>2</sup> *šum-ma gir* <sup>lú</sup>gig *ša zag sa úr udu.níta ša zag šum-ma gir* <sup>lú</sup>gig <sup>43</sup> [*ša gù*]<sup>b</sup> *sa úr udu.níta ša gùb ti-qi* <sup>sig</sup>šid sila<sub>4</sub>.nim *u* <sup>mi</sup>sil<sub>4</sub>.nim *nu .nu.nu* <sup>44</sup> [*x t*]<sub>a</sub>.àm *kešda kéš e-ma kéš én šid-nu-ma kéš-su*.

<sup>26</sup> See ARM 23 207, ARM 13 56. See the detailed description of the fabrication of the drum in Mirelman Sam 2010 and a transcription with translation on the Geographic of Knowledge Corpus, <http://oracc.org/cams/gkab/P363269> (accessed 21/06/2022).

<sup>27</sup> Yet, in one attestation from Assurbanipal describing the mutilations he had committed to Teumma’s face: [*ina qu*]-*up-pi-e ma-at-nat bu-un-na-ni-šú* [...] <sup>3</sup> [...*ad*]-*di ru-'tu e-li-nu-uš-šú* “with a knife [I cut] the tendon of his face [...] I spat on him!” CT 35 32 i 2, (Weidner E. 1932-1933, 180 n.11). Without any doubt, *matnu* (a synonym for *šer'ânu*) designates the sinews, not other cordlike structures. How did the king disfigure Teumman’s head? Is it conceivable that the king had enough

tendons, such as crossing (Schmidtchen E. 2021, 197).<sup>28</sup> Therefore, as a body part *šer'ānu* could be a cordlike structure like veins, arteries, i.e., blood vessels. (Interestingly, the umbilical cord has a proper name: *abunnatu*. However *matnu* “string” could be employed for the penis; see references *sub* <http://oracc.museum.upenn.edu/tsae/cbd/akk/M.html>).

Predicting the sex of the baby from the appearance of the veins in a pregnant woman’s breasts allows matching *šer'ānû* to veins without hesitation, as can be seen in this example of from Sa-gig tablet 36: 49 “If the veins in a pregnant woman’s breast are straight.”<sup>29</sup> As I wrote in 2000, there is no visible tendon, artery, nerve, or muscle in a pregnant woman’s breast; the veins are the only possible option. More difficult to understand in the physiognomic women’s section 4<sup>30</sup> is that the veins of the nipples (*appi tulî*, breast tip) are dark. It is possible but not sure if these are veins around the nipples.

The possibility that these *šer'ānû* might be painful, stiff or “moving” led to a translation by muscles. This identification or name is especially suitable as the muscles of the limbs or the neck, in particular, have an elongated, fusiform shape. The fact that oil could help the *šer'ānus* to relax was a good reason for the muscle translation: Sargon II 43: 41 “that there will be no interruption in what is desired by the sick, that oil – the pride of mankind that makes (tired) muscles relax – does not become expensive in my land.”<sup>31</sup> In the same way, in English, some muscles are called strings: “In human anatomy, a hamstring is any one of the three posterior thigh muscles.”<sup>32</sup>

Fritz Kraus adopted this translation in the physiognomic texts<sup>33</sup> as did René Labat in the TDP.<sup>34</sup> As seen above, in some body parts, there is neither tendon nor ligament.<sup>35</sup> Moreover,

knowledge of anatomy to cut the ligaments of the jaw joints? Or to sever the muscles from the bones? On the bas-relief of the British Museum where the cut-off head hangs in the garden of Ashurbanipal, the face appears to be intact. It is likely that the king just slashed his enemy’s face without attempting to dissect it. See Glassner J.-J. 2006, 47-55, <https://doi.org/10.3917/cas.002.0047> (accessed 07/11/2021)

<sup>28</sup> See also Wee J. 2019b, 105: “The few occurrences of *tallu* (“transversal line”) in the Diagnostic Handbook (Sa-gig tablet 3: 107 (TDPT 3: 98); Sa-gig tablet 4: 120, 122 (TDPT 4 rev. 35, 37) seem to refer to intersecting “strands” in the sick man’s head, temples, or hands, perhaps describing an excessively net-like appearance of superficial blood vessels near to the skin’s surface.” (Note that John Wee employs TDPT for “TDP Tablet” followed by the number of the tablet as given by Labat in his *Traité Akkadien de Diagnostics et Pronostics Médicaux*. In this article, the usual numeration is followed: TDP followed by the page number and the line number.)

<sup>29</sup> TDP 204 49, Scurlock 2004 245: 49.

<sup>30</sup> Böck B. 2000 162: 172 from SpTU 4 149: 15 see BABMED *Sinništu qaqqada rabât* W 23286 [https://www.geschkult.fu-berlin.de/e/babmed/Corpora/1-Jahrtausend/W\\_-23286/index.html](https://www.geschkult.fu-berlin.de/e/babmed/Corpora/1-Jahrtausend/W_-23286/index.html) (accessed 04/06/2022).

<sup>31</sup> <http://oracc.museum.upenn.edu/armep/akk#Q006524.36> (accessed 04/06/2022).

<sup>32</sup> <https://en.wikipedia.org/wiki/Hamstring> (accessed 05/09/2022).

<sup>33</sup> E.g. Kraus F. 1947. In the text K 10901: 12'-17' 195-196, the *šer'ānu* of the toes “*zi.zi ittenebî*”. Usually there are no visible tendons or blood vessels there. The notion that it refers to a sensation is most likely. The translation “der Muskel seiner Fußzehe wiederholt zuckt, the muscle of his toe twitches repeatedly” is clever and consistent.

<sup>34</sup> Labat R. 1951, 21, Sa-gig tablet 3 25: 50 “si les muscles de ses tempes l’élancent, s’il a chaud et froid”. Worth noting the action of the *šer'ānu* is different according to the context: in the physiognomic text, it is a banal phenomenon, and in the TDP, a hurtful sensation.

<sup>35</sup> See in CAD Š II 312a A list of body parts with predictions linked to *šer'ānu* in medical and physiognomic texts. The presence of cordlike structures on arms, legs, and face can be explained and related to tendons or blood vessels (which I tried to justify in my 2000 article). Others are more

considering the fact that certain features of the strings may imply movement, they thought, with justified logic, that *šer'ānu* referred in these cases muscular jerks or muscular pains. The path from tendon to muscle is very close, and their translation is quite valid.

Nonetheless, this extension of the term *šer'ānu* to muscles is superfluous. First, it is possible that for ancient Mesopotamians, as for us, sinews or tendons could be painful or “jerking” and could be soothed or relaxed.<sup>36</sup> In consequence, there is no need to restrict these notions to muscles. Second, muscle as an anatomical entity was likely known to them (e.g., through butchery, traumatology, etc.). Muscles are of no use in making solid strings, and indeed, it is easy to distinguish between these different anatomical structures. It is perfectly understandable when we know that ancients associated the *šer'ānū* with solid, flexible elements used to tie, bind and consolidate. It is also reasonable to associate *uzu – šīru*, “flesh”, with muscle.<sup>37</sup> For example, emaciation, rendered by *šihat šīri*, “muscle wasting”,<sup>38</sup> does not describe *šer'ānu*. In Sa-gig tablet 33: 98<sup>39</sup> or in the therapeutic texts AMT 29/2 r 2' + AMT 91/1 r 14, AMT 42/6: 1, CT 21/1: 1<sup>40</sup> “if all the strings (sinews/nerves *sa<sup>meš</sup>*) of his thigh(<sup>uzu</sup>*úr-šú*) provoke a all-consuming pain (*ikkalūšu*) for the patient so that he cannot get up and walk, this disease is called *sa.gal*, (*sagallum*) ‘long sinew’.”

In a Mari letter in which a man uses a pain in his leg as an excuse not to go into battle we find a telling example of *šer'ānum* as “nerve”: ARM 26/1 266: 2-9 “on the very day when I was preparing to leave, a piercing/stinging pain (*zi-iq-tum*) went up in my foot, (while I was still) in the palace, in all the sinews (*na-ap-ha-ar še-er-ha-ni*). Below, up to the soles of my feet, and above, up to the bottom of my loins, <sup>2</sup>(it) transfixes me/raged (*ša-me-er*) against me.”<sup>41</sup> But this interpretation is possibly a modern one, that the sufferer thought the sinews of his leg were hurting him.

acrobatics, like this example from the physiognomic texts (Böck B. 2000, 112; Alamdimmu VIII) showing the identification difficulty:

9. diš *še<sub>17</sub>-ir-a-an igi-šú zaq-pu : tar-šu*.

10 diš *še<sub>17</sub>-ir-a-an igi-šú duh-at-rù*.

9- If the cord of his eye is pointed or extended.

10- If the cord of his eye is released.

In physiognomy texts, the cords of these eyes are supposed to be visible. It is difficult to know what they are, eye muscles? Ligaments? Blood vessels? There are no visible ligaments or muscles in the eyes, not even in the eyelids, and what about those overhanging or relaxed blood vessels?

<sup>36</sup> See Geller M. 2001-2002, 71: in his translation of physiognomic passages, he prefers an identification of *šer'ānu* as tendons: “the tendons quiver.”

<sup>37</sup> James Kinnier Wilson in 1962 already proposed it.

<sup>38</sup> Already in Kinnier Wilson J. 1962, 60.

<sup>39</sup> Heeßel N. 2000, 357 Sa-gig tablet 33: 98 (// Sa-gig tablet 14: 164' partly broken) [*šumma šer'ānū pēmišu*(<sup>uzu</sup>*úr-šú*) *ištēniš ikkalūšu tebā u alāka lā ile ' 'ē sagallu [šumšu]*].

<sup>40</sup> AMT 29/2 r 2'+AMT 91/1 r 14 [diš (na) *sa<sup>meš</sup> uz<sup>u</sup> 'úr-šú 1-niš [gu<sup>meš</sup>-šú zi-a] u gin<sup>meš</sup>-[ku la i-lel-[ 'i] AMT 29/2 r 3' . [...]] sa.[gal mu.ni<sup>?</sup>*

AMT 42/6: 1 diš na *sa<sup>meš</sup> uz<sup>u</sup> 'úr-šú 1-niš g[u<sup>meš</sup>-šú...*

CT 23/1:1 diš na *sa<sup>meš</sup> uz<sup>u</sup> 'úr-šú 1-niš gu<sup>meš</sup>-[šú] [zi]-a u du<sup>meš</sup>-ka la i-le- 'i sa.gal mu.ni*

<sup>41</sup> See ARCHIBAB (URL: <https://www.archibab.fr/T7422>) for bibliography, French translation, and philological comments. See in particular Durand's statement concerning *šamāru*. This colourful and suggestive way of describing pain has not been adopted (or known) by the doctors. Habdu-Amim, who also uses this verb (ARCHIBAB: (URL: <https://www.archibab.fr/T74223>) FM 16 9: 24 (“my foot transfixes me/raged and I became ill”) was perhaps the creator of this expression and the author of both letters.

One may wonder: did doctors differentiate between the distinct anatomical structures grouped under the term *sa – šer'ānu*? John Wee asks the question and seems to answer positively: “Just because the same word could be used for different structures, however, does not imply that the ancient healer was uncertain what the term ‘strand’ meant in particular contexts.” (Wee 2019b 298)

#### 4. To provide some more evidence, we can look at the association of *šer'ānu* with blood.

**4.1.** The first impression is that this association was noticed and recognized by the **ancient lexicographers**, as John Wee points out (2019a, 25 footnote 89): “*sa = da-mu* (i.e., *dāmu*, “blood”) in the SB *List of Diseases*, line 156 (216) (*MSL* 9, 95); “*sa [means] blood*” (*sa [ : d]a-mu*) in Comm. Sa-gig tablet 36, rev. 6' (§II.1.27).” Caution can be advised with this lexical reference: veins taking blood are a pathological sign seen on the chest,<sup>42</sup> on the temple,<sup>43</sup> hands.<sup>44</sup> This is in contradiction with the veins that are supposed to carry blood. To justify this description as a pathological sign, we can interpret it as a local suffusion of blood near a vein, not that veins full of blood would be a sign of disease.

An incantation (BAM VI 524 ii 4', 6') asks for knotting the *šer'ānu* in order to stop nose bleeding: “*sa-ka lik-ka-šir-ma*” let your blood vessels be knotted.”<sup>45</sup> The association of bleeding and *šer'ānu* is indisputable. From my point of view, this assertion is close to the creation myth of man where blood is tied up in order to create bones (see Nele Ziegler 4.2.2. below). Interestingly, the treatment of nose bleeding in SAA 10 259 n°321, 260 n°322 is made with a tampon placed in the nostril. When the physician explains how to prepare the tampon, he adds that incantations should be recited over them, possibly even our incantation. But when the treatment fails to stop the bleeding, he simply explains how to place the pads correctly, without mentioning the incantations. The physician knew perfectly that there was no use in binding blood vessels or what he called *šer'ānu*. The result of the treatment was to coagulate the blood and to stop its running mechanically. Are incantations just wishful thinking? What interpretation and meaning should be given to the content of an incantation? Did they reflect the conceptions of the ancients on the functioning of the body and its failures? Were they literary creations devoid of substance? Paul Veyne’s interrogation about the beliefs of the Greeks in their myths can also be asked concerning the Mesopotamians and their incantations.<sup>46</sup>

#### 4.2. Actually, other words designate veins or blood vessels:

**4.2.1. *ušultu*,**<sup>47</sup> this anatomical structure is associated with blood (see CAD U 329, AHW 1443). In lexical context, it can correspond to blood or venous blood or to blood vessel.<sup>48</sup>

<sup>42</sup> Rutz M. 2011, 301, CBS 12580: 5.

<sup>43</sup> Schmidtchen E., 2021 Sa-gig tablet 4: 91.

<sup>44</sup> Schmidtchen E., 2021, 461 Sa-gig tablet 11: 64'.

<sup>45</sup> See in Collins T. 1999, 183 another incomplete attestation of *šir-a-ni li-lkašir-ma*.

<sup>46</sup> Veyne P. 1983. For the role of incantations with respect to magic and etiology see Geller M., Panayotov S. (2020, 34-36).

<sup>47</sup> This word is found in the exorcistic ritual, Maqlû 8: 72'' in an enumeration of Lamaštu’s body parts: <sup>71''</sup> [x-x-x-x-x] *tākaltaki amha[š]* <sup>72''</sup> [x-x-x *uš*]ultaki(ú)-[išul-ta-ki] *hašēki at[ruk<sup>?</sup>]* <sup>73''</sup> *unāti ša libbīki kalīšina adlu[h]* “<sup>71''</sup> [...], your stomach I stri[ke], <sup>72''</sup> [I ...] your blood ve[ssel], your lungs I b[eat(?)], <sup>73''</sup> All your innards I disturb.” <http://oracc.museum.upenn.edu/cmawro/akk#Q002712.73> accessed 21/06/2022. In the Neo-Assyrian lexical tablet (with vocabulary groups) MSL 17: 222 Antagal G: 51



The most convincing attestation (which confirms that this word means vein or blood vessel) comes from a bilingual text in an Uduḡ-hul incantation describing demons. The *Gallû-demon*<sup>49</sup> is said to drink blood from these *ušulâti*-veins: “eating flesh, causing blood to flow, (then) drinking from the veins.”<sup>50</sup> Another passage from *Enuma Eliš* iv 130 confirms the fact that these veins (or arteries) contain blood: “he (Marduk) split her (Tiamat) blood veins, and let the north wind carry (her blood) to a secret place.”<sup>51</sup>

We can imitate the ancient commentators: “if ‘sa’ is linked to blood and means *šer’ânu* as blood, having the same sumerogram “múd” as vein *ušultu*, we can conclude that sa – *šer’ânu* means vein.” Unfortunately, sa is not equated with *ušultu* but rather with *matnu*, *manânu*, and *gidu*, other words for “sinew”.<sup>52</sup>

#### 4.2.2. *pursîtu*-bol and vascular network?

Another text might lead us to believe that the ancients suspected the existence of a vascular network. A description of blood being knotted up in a Mari letter has been studied by Nele Ziegler (2005, 4-5). In this letter the chief musician explains that he “*da-ma-am i-na pu-ur-si-tim ak-šú-ur*, j’ai noué le sang dans les veines”. She follows the reasoning of the authors who commented on a passage in the *Enuma Eliš* where blood is knotted to produce bones (*EnEl.* vi 5). She proposes that the metaphor used by the chief musician denotes or reflects the notion of a network of blood-filled vessels. It should be noted, however, that these blood vessels are “*pursîtu* bowls” and not “*šerânu* strings/ropes”.

#### 4.3. Bloodletting in the temporal area: a way out for evil?

The ancient Mesopotamians likely knew that veins contained blood, but did they theorize that this blood flowed from one point to another in the body and that these veins (or sinews) carried blood, disease, or an evil agent into the body? Marten Stol (1989, 163-165) studied the different attestations of bloodletting in the temporal area, beginning with the famous temple incisions in the Hammurabi code (§ 215-220). He stressed the importance of these scarifications, which still persist in the Middle East. Mark Geller (2004a) was interested in this practice used in Greek medicine and looked for its premises in Babylonian medicine.<sup>53</sup>

<sup>48</sup> *uš(BAD)* = *ú-šul-tum* the sumerogram *úš* (pronounced *uš* meaning blood) means blood vessel <http://oracc.museum.upenn.edu/dcclt/akk#P365399.43>. (Accessed 21/06/2022 references and bibliography.)

<sup>49</sup> In the lexical list *Ea* (cf. in a Middle Assyrian text MAOG 11/1-2, 99-109, pl. 1 [Ea]: ii 16’ and in a First Millennium text *Ea* 01: 41d): *lagab ušulti*, lump of venous (blood) or as proposed in <http://oracc.museum.upenn.edu/dcclt/akk?xis=akk.r0062e1> lump of mud (accessed 21/06/2022).

<sup>50</sup> These demons are classified as vampires or ogres in Uduḡ-hul tablet 5: 138 “*âkil dami la muparkûti šunu* They do not cease eating blood”. This image refers to the drinker of blood but also to the eater of bloody human flesh. Geller M. 2016, 204.

<sup>51</sup> Geller M. 2016, 203, Uduḡ-hul tablet 5: 134.

<sup>52</sup> *ú-par-ri-i'-ma uš-lat da-mi-šá ša-a-ru il-ta-nu a-na pu-uz-rat uš-ta-bil*: *Enuma Eliš*, “When on High” the Mesopotamian Epic of Creation has been translated by many authors (see wikipedia for a short bibliography [https://fr.wikipedia.org/wiki/En%C5%ABma\\_eli%C5%A1](https://fr.wikipedia.org/wiki/En%C5%ABma_eli%C5%A1)). Note that Lambert W. (2013, 92-93) reads *bu-us-rat* and translates: “to give the news” while Talon P. (2005, 55, 94) reads (like CAD U, 329) *pu-uz-rat* and translates “il découpa les veines de son sang que le vent du nord emporta vers des lieux inconnus”.

<sup>53</sup> See [MSL 13, 104] Nigga 291, 294, 295 on the Sumerian Dictionary online: <http://oracc.org/epsd2/o0037088>; version 2.6 (accessed 21/06/2022.)

<sup>54</sup> Note that Mark Geller (2004a, 305-324) in his article on bloodletting, discussed the Greek origin of this practice. See Marten Stol on this subject (1989, 164).

An interesting medical case of a man who presents a “grip” of his temple shows how bloodletting was used in a ritual. The patient had different manifestations of the pathological state named *sag.ki.dab.ba*: his ears roar, his eyes are veiled, the cords of his neck are painful, his arms present persistent numbness, his kidneys are demolished, his inside is all churned up, his feet present persistent atony, this man is stalked without respite by a persecuting ghost, to heal him: <sup>54</sup>

On the 15th day, the day when Sin and Šamaš stand together you dress this man with a sackcloth, with an obsidian blade you scarify his temple and draw blood flow, you make him sit in a reed hut, facing north, for Sin, in the direction of sunset you place a juniper censer, you pour cow’s milk, in the direction of sunrise you place a cypress censer, you pour good quality beer, this man will say this:

There follows a prayer in which the patient implores Sin and Šamaš to judge and absolve him. He describes his ailment as follows: “the evil wind has dilated me, a Persecuting Ghost stalks me, I am thrown down to the ground, confused and churned up.” Then the exorcist takes the patient out of the hut and dresses him in a pure garment. An incantation follows, pleading with Sin and Šamaš to get rid of the disease.

Medical procedures included also to slash the blood vessel of the temple. In BAM V 482 iii 51’-57’ a classical treatment with plants plastered after shaving and anointing is prescribed. But after 4 days the doctor is invited to smash the blood vessel probably to make it bleed (*sa sag.ki-šú ta-ma-ḥaṣ-ma*) the procedure is as follows:

BAM V 482 i 64’ If a man’s temple hurts him in an all-consuming way (*gu<sub>7</sub><sup>II</sup>-šú*): you pierce (his temple *tatakkip*) with a bronze (sharp object *siparri*) once, twice (or) three times [until? the blood? starts flowi]ng<sup>?</sup>(*[ill]ak*, (and then) you anoint him with *nikiptu*-spurge in oil.<sup>55</sup>

The medical practitioners most likely scarified in front of the temporal vein, and the blood flowed. Could it be that they sometimes made a mistake and cut the temporal artery? The blood would then gush out in spurts that they could not stop, which could have caused the death of his patient or at least made him faint! This is what would be described in the Code of Hammurabi. Nice story, a kind of science fiction from the past. But can this ritual (or medical manipulation) convince us that the purpose of the “surgical” act was to get the ghost out through this incision? A ghost was chasing the patient, but there is no mention that it entered his body through his ears and invaded his body. The fact that ghosts can enter a person’s ear is known in the tablet *Šumma ālu* 19: 53’-56’;<sup>56</sup> the consequence is harmful and can even lead to the death of one of the family members (but not the one whose ear was penetrated by the ghost). Similarly, in Sa-gig tablet 4: 47’, a man hearing a ghost screaming leads to his death. The sequence of cases seems to mean that the noise made by a ghost, and heard by a person, was harmful. In the incantations, when a patient asks for evil to leave his body, ghosts are not

<sup>54</sup> (BAM IV 323: 89-107 // BAM II 228: 23-32, BAM II 229: 17’-27’ Scurlock JA. and Andersen B. 2005, 305-307, Scurlock JA. 2014, 696-697, 700, the translation is taken from Irving Finkel 2021, 184.

<sup>55</sup> For BAM V 482 transcription see <http://oracc.org/asbp/ninmed/P365744>, with bibliography.

<sup>56</sup> Freedman S. 1998, 280-281.

mentioned (at least to my knowledge); rather, the patient wishes for his symptoms, his illness, or the cause of his ailments, such as the evil wind, to leave his body. This scarification may be a gesture of mourning, such as dressing in sackcloth, or an act of distress to appease the deities.

An example of the mourning context of this type of self-mutilation is found in a letter sent by Assurbanipal (ABL 571) to Babylon citizens, warning the people of Babylon of the danger of resisting his troops. He advises them to speak to their friends and convince them to surrender. They should, for this task, rend their garments and take an obsidian knife to scarify themselves. This self-mutilation was a sign of mourning and great distress. (Transcription and translation in Sanae Ito, 2015, 206-207)<sup>57</sup>

**4.4. To sum up, *šer'ānu* is related to blood:** the ancients were probably aware that these “cords” contained blood. But, perhaps it was the same as for the part of the digestive tract called “*irri damī*, bloody gut.”<sup>58</sup> It could just be vascularized organs such as the nose, tongue, etc., that bleed profusely when injured.<sup>59</sup> So, to say that it is a “bloody” part of the body means that these cords contain blood but does not necessarily mean that they carried blood. Containing is not transporting, containing does not involve blood circulation. To answer Wee’s question, the anatomical structure, *šer'ānu*, linked to blood had characteristics, for the ancient scholars, that could differentiate it from the purely tendinous structure. It is therefore reasonable to confirm that the answer is yes, physicians differentiated the different anatomical structures grouped together under the term *sa – šer'ānu*.

## 5. And we arrive at the blood circulation and the pulse:

This translation variability and imprecision (especially for Ader in German) makes it difficult to understand a symptom frequently described in the *Sakikkū* diagnostic handbook: the *šer'ānu* that *illak* “goes, moves along, walks,” in opposition to the *šer'ānu* that is placed, *šaknu* or calm, *nēh*. JoAnn Scurlock (2014) opted to translate by “go”, allowing the readers the freedom to interpret it according to their sensitivity and body knowledge. Others (like Eric Schmidtchen 2021) have adopted a more oriented translation *alāku* would correspond to “to beat, pound”, and by opposition *šakānu* and *nēhu* to “be slow, undetectable, imperceptible.” Another verb *zi*, “*tebū*” to stand has been associated with pulse, and is until now often translated by throb (see NinMed BAM V 480 r ii 9 <http://oracc.org/asbp/ninmed/P365742> consulted 14/09/2022).<sup>60</sup>

### 5.1. Veins and arteries: some anatomical details

One point is crucial: veins do not beat, so one cannot see a superficial vessel beat (let’s put aside the jugular vein pulse with its complicated technical measurement). Arteries do beat, and it is possible to detect the pulse through palpation. When the artery is superficial, a pulse can be seen, especially when the skin is thin.<sup>61</sup> The artery itself is not visible when it is

<sup>57</sup> The picture of this tablet is on CDLI 393854. It reminds of the humiliating way in which the notables of Calais brought the keys of the city to the King of England, barefoot, in their shirts, and with a rope around their neck.

<sup>58</sup> CAD I 182a *sub irrū* and <http://oracc.museum.upenn.edu/dcclt/akk-x-stdbab#P370373.59>

<sup>59</sup> BM 45690 iv 18: “The head was severed, the blood was flowing from mouth, ears and nose” Lambert W. 1965, 6

<sup>60</sup> See the initial transcription and translation by Martin Worthington 2005, 6-43.

<sup>61</sup> It is possible that this phenomenon is described in a commentary from Uruk (Achemenid period) <http://oracc.org/cams/gkab/P348457>. The comments concern tablet 14 of the Sa-gig series: SpTU 1,

healthy. When an artery is injured, blood flows out of it abruptly in jets, in rhythm with the heartbeat.<sup>62</sup> It is not difficult to measure the arterial pulse by precise palpation along the arterial line, for example the radial pulse on the inside of the wrist or the temporal artery on the side of the forehead. The ancients could take the pulse but it is not clear if they understood that the arteries (or a blood vessel) produced it. Note that usually arteries are deep and that, for example, the temporal artery is often difficult to locate during dissection. And, of course, they do not pulsate during the “dissection” of a dead person or animal. In fact after death there is no fluid blood in the heart or arteries due to blood coagulation.<sup>63</sup> Eventually, during the first steps of an autopsy, blood can be drawn from large veins. If an animal is killed and opened rapidly fluid blood can be found in its heart like in the sordid story told by Assurbanipal (CAD Š I 231-232, CAD P 206 see also Nicola de Zorzi 2019, 230): his enemies were so thirsty that they cut open their camels and drank their blood (probably from the camels’ heart or from the belly as they drank also the watery excrement from the digestive tract). In any case, ancient Greek physicians believed that the heart and the arteries carried air in the body and not blood.<sup>64</sup> Anyhow, to find blood in body parts like trachea or bowels did not lead the ancients to believe that they were blood carriers (see CAD D 76 *sub damu* 2’). All these anatomical features justify why it took such a long time to describe the bloodstream; William Harvey, an English physician, discovered it in the early 17th century.

## 5.2. Heartbeat and pulse.

What to make with the heartbeat? We have several references proving that the ancient Mesopotamians were aware of the heartbeat: *uppu*, a small drum is a metaphor referring to heartbeat in *Atrahasis* i 214 (Lambert W., Millard A. 1999: 58).

<sup>210</sup> From his flesh and blood <sup>211</sup> Let Nintu mix clay, <sup>212</sup> That god and man <sup>213</sup> May be thoroughly mixed in the clay, <sup>214</sup> So that we may hear the drum (*up-pa i ni-iš-me*) for the rest of time <sup>215</sup> Let there be a spirit from the god’s flesh.

In their introduction (p. 22), the authors comment on this passage: “The flesh of the slain god is the source of the spirit of man. We might have preferred the blood, as not being so material and solid, but in traditional mythology, it seems that blood supplied the purely animal life, that ends at death.” They judged that the drum could allude to a religious ritual,<sup>65</sup> but CAD U accepting Anne Kilmer’s idea (1972: 163) proposes that this instrument is a metaphor for the

036: 8 “(If) his right buttock pulsates (means): whose skin pulsates on the surface.” It can refer to arterial pulse (but arteries are deep in this location) or to superficial fasciculation.

<sup>62</sup> See in CAD N I 285 *sub sapāšu*, a description of the blood gushing with slaughter (CT 31 32 r.7).

<sup>63</sup> George A. (2003, volume II 895) cites Watanabe K. (1994) with a neo-Assyrian letter (ABL 455 12-14) where the writer pleads that he is no more alive because the blood in his heart is dry: *a-ke-e la-ab-laṭ a-li ni-ki-ti dame-e-a ina lib-bi-ia e-tab-lu.*” SAA 15 30: 12-14 <http://oracc.org/saao/P334316/> (accessed 23/07/2022).

<sup>64</sup> See Charles Ozanam’s comprehensive overview of the history of blood circulation (1886, 3-27), [https://archive.org/details/BIUSante\\_20277/page/27/mode/2up](https://archive.org/details/BIUSante_20277/page/27/mode/2up) (accessed 20/07/2022), and a more recent digest by a physician: Baudouin R. 2020, URL: <https://www.researchgate.net/publication/350544740> (accessed 20/07/2022).

<sup>65</sup> Lambert W., Millard A. 1999 p. 152 note 214: “Although the precise allusion to the drum *uppu* is obscure, there is no better alternative. The drum called *uppu* had a cultic use, and was ‘heard’, whereas no other object called *uppu* could be so described. Perhaps at the time of the composition of this epic the daily meals of the gods were introduced in the sanctum to a beating of the drum.”

heartbeat. She also suggests that the heartbeat is “the constant reminder of the god in man.”<sup>66</sup> John Wee (2021: 402) goes further on and believes that “it would be more precise to view this as a reference to the pulse.” In CAD U we find a small reference in a partly bilingual text, unfortunately very incomplete, associating the chest to the drum: CT 42 30b r 7 “(*i-rat-su ki-ma up-[pi ...]*), his chest like a drum ...” This is another point comforting the connection between breast, heart, and feeling or listening to its beating.

Actually, the Mesopotamians understood that the heart was pounding and that its pace could accelerate and be experienced in an undesirable way; the verb for it is *tarāku*. This beating was felt when one was running, was furious, or terrified. See quotes in CAD T *sub tarāku* meaning 2 p. 204, and AHW 1325.<sup>67</sup>

The rapid heartbeat is described in the Underworld Vision of an Assyrian prince.<sup>68</sup> After returning from the land of no return, the prince states that: “I woke up, and like a man who has lost blood (*kīma etli tapik dami*), who roams alone in a reed thicket, who is overtaken by a runner, so that his heart beats fast (*itarraku libbušu*).”

Particularly vivid examples are those employed by Sennacherib or Esarhaddon with this humiliating comparison to describe their enemies’ terror:

Sennacherib 022 vi 29-32 “Their hearts throbbed like the pursued young of pigeons (<sup>29</sup>*ki-i ša at-mi tu.mušen* <sup>30</sup>*kuš-šu-di i-tar-ra-ku lib-bu-šú-un kī ša atmi summati kuššudi itarrakū libbūšun*); they passed their urine hotly, (and) released their excrement inside their chariots.”<sup>69</sup>  
 Esarhaddon 001 iv 85-v 1: “their hearts were pounding and <sup>v1</sup> they were vomiting gall.”  
*Libbašunu itarrakma ima ‘u martu* <sup>iv85</sup> *lib-ba-šú-nu i-tar-ra-ku-ma* <sup>v1</sup>*i-ma- ‘u mar-tú.*<sup>70</sup>

But is it really the heart that pounds? The following example is ambiguous: the logogram could be that of entrails (*ša<sup>meš</sup>-šú, irrūšu*) which suits the association of bilious throwing up or involuntary bowel movements: Tiglath-pileser III 48 “his heart / his viscera pounded” *it-ru-ku ša<sup>meš</sup>-šú* (*itrukū libbūšu / irrūšu*).<sup>71</sup>

*Nakādu*, “to beat, to throb”, is another verb employed in the Gilgameš epic: Gil. VIII ii 16 *ilput libbašūma la inakkud* “he touched his heart (and felt that) it was not beating” CAD N I 153). It is meaningful that this verb’s main meaning is linked to fear, worry or anguish. In tablet XI (George A. 2003, volume I 722-723: 295) the plant that restores youth and allows being always alive and young is the plant of heartbeat *šammu nikitti*, (see explanations and justifications of this translation in George A. 2003, volume II 895).

This verb, in a commentary (SpTU 1 41: 7), is a synonym for to be infected, feverish, which is consistent with the acceleration of the heart rate during a high fever. Its meaning evolves to

<sup>66</sup> Anne Kilmer sportingly admits that these ideas were discussed in her classes and those were the work of two of her students.

<sup>67</sup> See Steinert U. 2022, 65 and 78 notes 87 and 88 for the association of *tarāku* with fear.

<sup>68</sup> (<http://oracc.org/saao/P337164/>). See also Finkel’s translation (2021, 166).

<sup>69</sup> <http://oracc.org/rinap/Q003496/> (accessed 22/08/2022).

<sup>70</sup> <http://oracc.org/rinap/Q003230/> accessed (22/08/2022).

<sup>71</sup> <http://oracc.org/rinap/Q003461/> accessed (22/08/2022).

be anxious, worried, which is also consistent with the increase in pace brought on by these feelings.

Can we deduce from these examples that doctors were measuring the pulse? Although you can detect a chick's heartbeat by holding it in your palm, the point is about the speed of the heartbeat, not about how you detect it. It seems risky to go from those unpleasant heart rate accelerations found in literary texts to taking a pulse by a physician. Whether it is an increased heart rate due to physical exertion or panic fear, the heart rate had been felt (by the "subject") and not measured by palpation or by putting the ear to the chest (by the doctor).

So obviously, the ancient Mesopotamians knew that the heart was beating and how to feel it. He was aware that its rhythm was subject to change. The unresolved issue is whether they tried to *measure* this rhythm or just recorded these characteristics.

### 5.3. Did they record throbbing or pounding in other places? The answer is yes:

#### 5.3.1. In UGU III

AMT 14/5 ii 3'<sup>72</sup> [diš na š]u.gidim.ma dab-*su-ma* sag.ki-šú *i-tar-rak-šú* útar.muš úigi-lim  
 BAM V 493 i 58'<sup>73</sup> diš na šu.gidim.[ma] [dab-*su-ma* sag.ki-šú *i-tar-rak-šú* útar.muš úigi-lim ...]  
 BAM II 227: 4' [diš] [na] šu.gu<sub>4</sub>.ma dab-*su* sag.ki<sup>II</sup>-šú<sup>S</sup> [*i-tar-ra*]k<sup>74</sup>-šú útar.muš<sub>8</sub> úigi-lim  
 "If a person, the hand of a ghost gripped him so that/and his temple throbs for him: *tarmuš-lupin* plant, *imhur-lim*-confronts a thousand plant",<sup>75</sup> followed by the composition of a potion left during the night under the stars and drank in the morning on an empty stomach.

In this case *itarrak* can correspond to a sensation of pulsations in the temple (the possessive – *šú* after *itarrak* implies that it is felt by the patient and not seen by the doctor), which may or may not be painful but is certainly unpleasant.<sup>76</sup> The fact that this case follows one where the head stings the patient is consistent with a painful sensation (BAM V 493 i 55'-56'// BAM V 481: 13'-14', BAM I 9 r 51-52 // AMT 14/5 ii 1: sag.du-*su* táb.táb-*su*//*uzaqqassu*). Interestingly this pain could correspond to migraine with its distinctive unilateral and pulsatile ache.

**5.3.2. In a renal text** describing a pathology of the urinal tract Geller M. (2005, 48-49), BAM VII text n°2: 22-23 "If a man's hips (groin) afflict him either when he walks or lies down, [his] penis [ ... ]<sup>23</sup>stings him, burns him, and throbs (*i-tar-rak-šú*); after he urinates, he passes [blood ... ]." In this case the throbbing is clearly a painful feeling in a painful context.

<sup>72</sup> For AMT 13/5+ transcription, translation and bibliography see <http://oracc.org/asbp/ninmed/P394756>.

<sup>73</sup> For BAM V 493+ transcription, translation and bibliography see <http://oracc.org/asbp/ninmed/P394480>.

<sup>74</sup> Traces.

<sup>75</sup> Krisztián Simkó on NinMed (see website note 68) translates "his temple causes him a throbbing sensation": he opts for a symptom felt by the patient and not for an abnormal visibility of the arterial throbbing on the temple.

<sup>76</sup> For a grammatical analysis of the verb *tarâku* in *Sakikkû* context see Schmidtchen E. 2021, 396-697.

**5.3.3. Sa-gig tablet 7:** 43<sup>77</sup> “When (it) throbs (*i-tar-rak*) in his mouth, and he throws out black blood.” This description is difficult to understand. The dark bleeding can have many causes (low origin). A bad consequence of heavy bleeding is shock with an accelerated pulse (see the Underworld Vision quote above). This could be the pejorative sign that worries the doctor. But this description is too terse for an accurate interpretation. Interestingly, there is no *-šú* after *itarrak* and yet, in the mouth, it is most probably a fluttering sensation.

**5.3.4. Sa-gig tablet 10:** 8 “When his neck throbs (*i-tar-rak*), his head falls down, his hands and feet stiffen, and he rubs (them) on the earth(?): Ardat-lilî demon has seized him.” The description of a throbbing throat is found in a medio-Babylonian parallel from Bogazkoy in KUB 37, 87:13’–16’ (*gú-su ú-tar-ra-lak* [s]ag<sup>2</sup>.du<sup>2</sup>-s[u ...] <sup>14</sup>, *u gír<sup>meš</sup>-šú* [it-ta<sup>2</sup>]-[...] <sup>15</sup>, *a-na qa-qa-[ru ...] <sup>16</sup>* ki.sikil x [...]). (see Schmidtchen E. 2021, 447 note 8). Sensations of throat pulsating are possible (modifications of the heartbeat can be experienced there), and the pulse of the internal carotid artery can be taken on either side of the neck. This case indicates that the beating was felt, seen, or taken on the throat.

**5.3.5. Sa-gig tablet 10:** 30 “If his breath throbs (*i-tar-rak-ma*) and is short (close), he will die.” In this case, the breathing rhythm is similar to the pulse rhythm. This would indicate that the pulse rate was well known (since it was used as a reference) if the statement (respiratory rate equals pulse rate) is correct. Interestingly the rhythm of the breath can be described as twitching, jerking, or being accelerated irregularly (Sa-gig tablet 10: 28, 29) with the verb *šahātu*, which, as will be noted later, is also used for the body strings.

**5.3.6. Sa-gig tablet 31:** 6-8<sup>78</sup> “If ditto (*šétu* burns a person and) it throbs (*il-tar-rak*) (and) knocks him (*i-sa-pik-šú*) down, and he has a burning fever...” Here what is throbbing or beating is not specified, it could be the breathing (which is often abnormal in high fever), but it could also be the fever itself which oscillates.

**5.3.7.** Another case can be added to this small file: another verb *šahātu* is used once in the physiognomic series to describe a sort of anarchic beating of the “cords”. In a physiognomic text (Böck B. 2000 282: 19) “*šumma šer’ân nakkaptišu adi appišu izaqqamma u išahhi<sup>79</sup>* if the ‘cord(s)’ from his temple to his nose is raised and moreover pulsate/twitch/jump.”<sup>80</sup>

Sa-gig tablet 4: 88 “if the left temple’ veins are greatly twitching (*galtiš išahhi<sup>79</sup>*) and sides of his finger (or top phalanges<sup>2</sup> of his fingers)<sup>81</sup> ...

<sup>77</sup> For Sa-gig tablets 3-14 see the transcription and the numeration of the lines in Schmidtchen E. 2021. For Sa-gig tablets 15-33 see Heeßel N. 2000, 150-374 and Scurlock JA. 2014, 13-292. The translation is mine but inspired by theirs (and of René Labat’s in TDP).

<sup>78</sup> See Heeßel N. 2000, 345, 348-349 and note 6-8. See also Schmidtchen E. 2021, 397 note 666.

<sup>79</sup> *Šahātu* means, above all, to jump. A commentary explaining the verb *rakābu* (to ride) gives this equivalence: *ra-ka-bu* : *šá-há<sup>2</sup>-[tu]* [šá<sup>2</sup>] [gír.pad]. [du<sup>1</sup>] “to ride” is “to move jerkily said of bones.” It is reminiscent of the definition of ligaments holding bones together, although this is more of a modern fantasy than a definition from ancient anatomy. Wagensooner K., 2018, “Commentary on Diri 1 (CCP 6.2.1),” *Cuneiform Commentaries Project* (E. Frahm, E. Jiménez, M. Frazer, and K. Wagensooner), 2013–2022; accessed July 15, 2022, at <https://ccp.yale.edu/P461303>. DOI: 10079/66t1gdh

<sup>80</sup> Die Auszugstafeln excerpt tablet TBP 23 and 69.

<sup>81</sup> See Jiménez E., 2014a, “Commentary on Therapeutic (én munus ù-tu-ud-da-a-ni) (CCP 4.2.A.a),” *Cuneiform Commentaries Project* (E. Frahm, E. Jiménez, M. Frazer, and K. Wagensooner), 2013-2022; accessed July 17, 2022, at <https://ccp.yale.edu/P459066>. DOI: 10079/ht76hsq and Jiménez E., 2014b, “Commentary on Sagig 4 (CCP 4.1.4.C.b),” accessed July 11, 2022, at <https://ccp.yale.edu/P461199>. DOI: 10079/n02v78t. See also Jiménez E. and Schmidtchen E. 2017, 216-241.

In these descriptions, the vein(s) (from the forehead or the temple to the nose) is visible, and there is fasciculation or a sensation of jumping or beating in the face. This would be an abnormal sensation of an increased or irregular pulse or a spasm of the upper half of the face. A hemi facial spasm is a spectacular and not-so-rare manifestation. The purpose of these interpretations is to show that the descriptions of the former therapists do not make it possible to distinguish between an abnormally visible and anarchic arterial pulse and superficial, possibly painful spasms.

**5.3.8.** We can therefore conclude that the heartbeat had been detected in the heart and probably in different places of the body, that its normal rhythm was well-known (but not quantified), and that its modifications were not only familiar but also connected to plausible causes. Having established these facts, is it possible that the physicians tried to check the pulse at several places on the body and realized that they could feel it in artery paths? And that it was connected to “*šer’ânu*-cords”? But beware, these “movements” can be explained by other means than the pulse (fasciculation, spasms). One must therefore be careful with translations.

## 6. *Šer’ânu* and *alâku*, *šakânu* and *nâhu*

If we consider that *šer’ânu* in temple anatomical contexts designates visible blood vessels, namely veins, we must understand the verbs *alâku*, *šakânu* and *nâhu*.

**6.1. *alâku*** “to go, to walk, move, to behave, to be loose and movable, displaced, to be meant for” are several translations found for *alâku* in CAD A I 300. Note that to be loose, movable, or displaced is found in extispicy and medical contexts for anatomical structures. *Alâku* designates also the habitual action of various phenomena such as rain (falls), wind (blows), liquid (flows), and time (passes). In the same type of meaning, it can designate to be suitable, like in SAA 19 204 r. 9 where rites are said to be “suitable” for the king (*li-lik-û*).

**6.1.1** “Definition” given by the ancient scholars to *alâku*:

The commentary to Sa-gig tablet 4 r. 3<sup>82</sup> gives equivalence for DU and GAR (one being the opposite of the other): “du: *re-du-<sup>1</sup>u* [(and for gar there are the following equivalences): *gar-nu* : *gar* : *šâ-ka-nu* : *gar* : *na-a-ĥi*, du (= Sa-gig 4: 85) (means) ‘go,’] du (can also mean) ‘go along’ [... *gar* (= Sa-gig 4: 85) (means)] ‘set,’ *gar* (also means) ‘be calm.’”<sup>83</sup>

If we follow this commentary, it could allude to the fact that blood moves or flows in the blood vessels towards its destination. But *redû* is possibly just indicative of the trajectory or course of the vein. If the blood-leading equivalence is valid in the context of temporal localization *alâku* can have other significance in other places.

In the commentary to Sa-gig tablet 4 (SpTU 1 30): obv. 2-3: [... *šâ<sup>meš</sup>-šû* al.du : *šâ<sup>meš</sup>-šû* [*i*]/*la-ku* / [... d]u : *a-la-ku* : *e-bé-ṭu* : *na-pa-ĥi*: “his innards ‘go’ (du) = his innards ‘move’ (in Akkadian), move = to move (in Akkadian); to be cramped (and) to be inflamed.” *Alâku* concerns inner organs (bowels). These body parts carry on digested food (*redû* could be a good choice), or by supposed abnormal movements (du = *alâku*) provoke cramps (*ebêṭu*) or

<sup>82</sup> Jiménez E. and Schmidtchen E. 2017, 216-241. Wee J. 2019b, 158-169 with references.

<sup>83</sup> See Jiménez E. and Schmidtchen E. 2017, 232, 237.



inflammation (*napâhu*). The second part of the commentary is logical and justified: “*e-bé-tu = na-pa-hi*: to be cramped is equivalent to inflame” because of the movement of the bowels.<sup>84</sup>

Another case gives a clue to what is the expected behaviour of *alâku* for the digestive tract: Sa-gig tablet 13: 6 “[If his upper stomach] burns him and is hot, if he eats bread and it does not pass (lit. “goes not over it/him,” *elišu lâ illak*), if he drinks water and it does not suit him (lit. “not favourable over it/him,” *elišu lâ tâb*), and if his body is pale, that man has a disease due to (illegitimate) intercourse.” It is difficult to explain why the redactor chose two different verbs for solid and liquid. It could signify that the blockage was different for each one or just it was a nice way to express the same blockage.

If we compare bread and water, *elišu lâ illak* is equivalent to *elišu lâ tâb*: it is evident that the standard passage of food (and digestion?) did not work.

#### 6.1.2. *Alâku* corresponds to usual, normal functioning:

For the digestive system, *illak* or *lâ illak* are used to indicate easy or problematic digestion. As for the blood (e.g. Sa-gig tablet 4: 15 or tablet 16: 39’ for blood flowing from the nose) it runs (*alâku*) or it overflows and “runs” (Collins T. 1999, 179, 184 Bleeding incantation 1: 28 and 4: 3’ *šurdûma illakû*). In several modern languages such as French or English, we can say in this case that “the nose runs”, could the ancients have done the same for *šer’ânu*? We can refer to the following proposal by James Kinnier Wilson (1962, 61): “means that it ‘is going’, much in the same sense as we speak of a clock or a watch ‘going’, that is ‘ticking (normally)’.” The regular action of *šer’ânu illak* can have two interpretations, it could be in the sense of tying, consolidating, being solid and reliable, or of being full or carrying blood (and maybe illness or malevolent divinities) to destination.<sup>85</sup> In *Sakikkû*, there are cases in which the fact that blood vessels at various points of the body are “going” is addressed as a worrisome sign (e.g. tablet 4: 110 “if the blood vessel(s) of his temples, his hands, his feet, his neck and his epigastrium “go,” 7 days, he will experience hardship, but he will get well” Eric Schmidtchen (2021: 97-98) points out that it is unusual in the medical literature for a normal state to lead to the development of pathological signs. He examines and investigates what is behind the expression *šer’ânu illak* in BAM 13. He admits that this could be their normal behaviour or function. But he points out that this hypothesis has limitations because the doctor-exorcist considers many clinical cases in which the “going (well?) strings/cords” are paralleled by abnormal signs in other parts of the body. The structure of these clinical cases suggests that these “going strings” are responsible for, or closely associated with, the development of pathological signs. For illustration, we have this ambiguous clinical case:

<sup>84</sup> This sequence of words requiring commentary might explain why words from different basic texts (Sa-gig Tablet 4:2 and Sa-gig Tablet 4:3) have been put together (see Wee J. 2019b, 357). In fact, the different words do not only have a "lexical or grammatical" explanation but also one that could be "pathophysiological in nature."

<sup>85</sup> In the following clinical case, it seems that *šer’ânû* can drive water somewhere. BAM I 32: 5 *šum<sub>4</sub>-ma gig im-šid-ma sa<sup>meš</sup>-šû a<sup>meš</sup> û-šal-la-ku* “if the wound bulges and its ‘strings’ carry water” See AHW 623a *mašâdu* G,3 (mit Krankheit) schlagen a) s. BAM I 32: 5 ; CAD M I 351b *mašâdu* 1 to strike with palsy or (in stative) to have a lump, a welt: giving this translation to BAM I 32: 5 If he was stricken with a wound/sore and his blood vessels make liquid flow out (of it) (Scurlock JA.2014, 438-439 follows this CAD translation.) The tablet deals with cutaneous ailment, *gig = simmu*. It seems more appropriate to choose the “lump” meaning, even if the verb is not in the stative state. The strings carry water (instead of blood) or allow water to flow out of the wound.

Sa-gig tablet 3: 91 “[If] he [from] his head to his waist (*mešlišu*, literally: half) the cords (*šerânûšu*, tendons/veins) are healthy but/and do not function (*lâ illakû*, literally: go), his groin is paralyzed (*kašâ*, literally: tied), his ears hear nothing: this man, the Evil One has seized him.”

Depending on whether one translates *-ma* as “and” (translation chosen by CAD Š II 311b) or “but” (selected by Schmidtchen E. 2021: 262) the fact that the strings “go/function” has a contradictory meaning: its strings are healthy and therefore do not “function” or are healthy but do not “function” in a satisfactory manner. For all these reasons it is improbable that *alâku* describes the normal functioning of the blood vessels or of the sinews.

The verb *alâku* has many meanings, and it is difficult to select one. Probably the equation one Akkadian word = one English word is impossible to apply. To underline the difficulties, we find a case that is far from the interpretation of the movement: Sa-gig tablet 11: 70’ “[If the cords] of his right hand are spread flat (*tabkû*) (alternately:) ‘go’ (*du-ku, illakû*) ...” What is described is clearly an aspect (“spread flat” as opposed to “bulging”) of the “cord” and not a movement.

**6.1.3** One point is without hesitation in favour of an aspect of the tendons or blood vessel. It is the use of *alâku* in **hepatoscopy**. In this context, we are sure that there is no movement, no throbbing, and that *alâku* describes an aspect of tendons.

The word *nimšu* designates the animal’s sinew in an Old Babylonian prayer recited by the diviner before performing hepatoscopy. He asks that: *nim-šu i-mi-it-tam li-li-ku šu-me-lam [li-na]-hi-is*, “let the tendons be raised on the right; let them be lowered on the left”<sup>86</sup> and the first line very of the reverse, “[*nim-šu*] *šu-lme<sup>2</sup>-lam<sup>2</sup>* li-[li]-ku i-mi-tam li-na-hi-su, let the *nimšu* of the right side be raised (and that of) the left side be lowered.” Interestingly Ivan Starr (1983, 64-65), studying *nimšu* (for Starr, the lumbosacral plexus) and the opposition between *alâku* and *nahâsu*, concludes that *alâku* in the context of hepatoscopy is “to be prominent, bulging, elevated.” As Starr rightly points out, the verbs *alâku* and *nahâsu* are used in opposition, in the same way as *tebû* and *nahâsu* (in the parallel text C AO 7031 cf. p. 65). We can easily deduce that *alâku* and *tebû* have similar meanings, and here the pulse disappears in favour of bulging.

**6.1.4** Another important argument in favour of this interpretation comes from an **Old-Babylonian text** published by Andrew George in CUSAS 18 (2013, 85-89). Text 15 is a “precursor” to *Sakikkû*. George shows how this forerunner is probably already a compilation of texts from different sources. For our purposes, in this tablet several cases concern *šer’ânu*. Even though the tablet is damaged in many places, it can be seen that the writer has alternated opposite aspects to *šer’ânû illakû* or *tebû*. One opposition very simple (§8) concerns the chest and the temple: *ša irtišu illakûma ša nakkaptišu lâ illakû*, “(*šer’ânû*) of the chest ‘go’, but of the temples do not ‘go’.” Another opposition seems to be §2-3, where *illakû* is followed by *takkû*, “flat, sunken”, or §21’ *tebû* versus *takkû* with an opposition between right and left temple. A problem arises with the opposition *illakû* versus *iš[pilû]* (§5’ veins of hands, §6’ of the feet “have [gone lower]”). Eric Schmidtchen proposes (2021, 99) to restore *iškunû*, but it would have been more appropriate to have the passive *šaknû*.<sup>87</sup> He points out that in the first

<sup>86</sup> HSM 7494: 27. See the tablet and bibliography on CDLI P370996 (Nougayrol 1941: 85 : 8 (AO 7031) // HSM 7494: 27. Starr I. 1983, 31: 27). See also transcription translation in CAD T 317a.

<sup>87</sup> And yet, one clinical description of the blood vessels uses this verb; it appears in a list of cases opposing “going” cords to various anomalies. Sa-gig tablet 4: 107, “if the cords of both his temple,

millennium *Sakikkû* the term employed is “*šaknû*”. It seems that George’s restoration of *iš[pilû]* is more grammatically correct. Could it be that *šer’ânu šaknu* of the first millennium BC refers to a vein that “sinks” or is “flat”? This text demonstrates that the physical characteristics of veins (or tendons) are being described, and that *alâku* is very close to *tebû* (as in the hepatoscopy texts of the diviner’s ritual). One problem remains, *šakânu* does not mean to be flat or sunken, the verb for flat *tabku* is found in *Sakikkû* as seen previously, the shift in meaning appears to be attested but needs to be clarified.

**6.1.5.** In brief, *alâku* refers to an aspect of these anatomical cords. It can also refer to the usual functioning of venous or sinew strings, although this seems difficult to prove. We are not out of the woods yet! This aspect may concern their course, their bulging aspect, or the regularity of their volume. An entry in *Sakikkû* could correspond to it: Sa-gig tablet 4: 100 [diš *šer’ânû*] *nakkapâtîšu ša imitti u šumêli ina alâki imtahrû* “[if the blood vessels] of his right and left temple in (their) course are identical.” We can also imagine an unpleasant sensation that would remind us of their binding, tightening, and maintaining function. Everything that concerns these cords is exceptional, if only because they are strongly linked to the principle of symptomatology, knowing that the name of the treatise on diagnosis and prognosis is Sa-gig, “sick cords”. The “cords” are closely linked to the notion of symptomatology or of pathological signs. These *sakikkû* correspond to symptoms (pathological changes in the body provoked by the diseases, usually manifestations perceived by the patient and leading him to consult). The problem is that *sakikkû* correspond also to the “signs” of the illness, i.e. the pathological findings made by the physician through interrogation, inspection and examination. It means that the pathological manifestations described in Sa-gig may correspond to the patient’s complaints (*alâku* could be a painful sensation) but also to the results of the doctor’s examination (*alâku* is an abnormal aspect of the body cords).

**6.2.** *Šakânu* is a widely used verb, with different meanings depending on the context. Initially, it means to put, place. In medical texts, for example, preparations are placed on the sick area. When a disease is placed, it means that it is imposed, inflicted on the patient. It can also be a mark (positive or negative) present or located in a specific place. In the case of descriptions of several skin ailments, plants, or minerals, the verb *šakânu* refers to their characteristic appearance. The CAD Š I 7h proposes that this verb means “to be lax.” For example, in YOS 10 47: 35, an old Babylonian text describing the behaviour of the sacrificial lamb, the characteristic of sinews “*nimšu šaknu*” would be suppleness, elasticity, or softness, in contrast to the hardness or rigidity: diš udu *ni-|iml-šu-šu ša i-mi-tim du-un-nu-nu ša šu-melim ša-ak-nu te-er-|tuml ša [šà] udu libbi immerim ša-al-mu*. If we chose this last meaning, this verb could refer to a lax body string, maybe with a winding course: “if a sheep’s right tendon is hard, that of his left is supple; the ominal configuration of the interior of the sheep is sound.”

**6.3.** *Nâhu* conveys notions of calm, quietness, and appeasement, which seems to be favourable, whereas, as far as vessels are concerned, it could be perceived as a negative sign if the presence of the vein is undetectable, imperceptible. Several commentaries clarify the meaning of this verb. Comm. Sa-gig tablet 4: 22-23 = SpTU I, 30, obv. 8-9<sup>88</sup> opposes “*ne-e’-*

hands and feet are sunken (*ittakû*, pressed down/flattened): he will die.” This description of collapsing veins can be observed in dehydration and has a bad prognosis.

<sup>88</sup> Wee J. 2015 259-260.

*et : né-he-et / [i-ra]d-ma : ra-a-du : sa-la-ha.*” In Sa-gig tablet 4: 22 *ne-e-et* is opposed to *sed-ât* (is cold) and in line 23 *i-rad* is opposed to *kúm* (is hot), the commentator chose to explain *nakkaptašu né’et*, his temple is “calm” in opposition to *nakkaptašu irâd*, his temple jumps, twitches.<sup>89</sup> So we can understand *nâhu* as to be calm, motionless, without twitches. But the commentary Sa-gig 3C<sup>90</sup> explains the word *né’a* with *nêhu* to be calm and *râmu* to be limp (Wee J. 2019b, 119, 121-122). This interpretation is more indicative of a defect in a ligament or tendon cord (which can be tight, taut, loose, and limp) than a fluid-carrying conduit.

**6.4.** So, must we follow the majority of translators, with *alâku* meaning to pulsate (normally or too quickly)? And *šakânu*, *nâhu* would correspond to a slow pulse, or even no beating at all, or to a normal, quiet beating? What can we tell about the pulse (assuming that doctors took it) by putting ourselves in the doctor’s place, at the patient’s bed? Just imagine this situation, even if the current *doxa* expressly forbids such behaviour, the risk of using a modern medical approach being *taboo*. Let’s hypothesize that they had noticed that fear, fever,<sup>91</sup> nervousness, or anger led to an accelerated pulse, just like the heartbeat. It is sufficient to read the numerous references in the CAD T 204b and AHw 1325a *sub tarâku* to understand that they described this phenomenon for the heart (see above) and maybe for other localisations. This “tachycardia” was likely felt but not measured. It was a “symptom,” an unpleasant sensation perceived by the patient, not a “sign,” an objective disorder of a disease searched for and found by the practitioner during his “physical examination”. But let’s continue the imaginary journey. Let’s imagine that the doctor knew the regular pulse rate and could evaluate its abnormal rate and even compare it by body part and body side. To explain their search, we hypothesize that they noticed this “beat” and took it as an arbitrary sign leading to a prognosis without any empirical basis. This could explain comparing the left and right sides and the pulse measurement in improbable body parts. And it could also explain why these observations are found in the Sa-gig = *Sakikkû* collection and not in the therapeutic collection. This does not necessarily imply that they had in mind the normal functioning of the organs (in this case, the “body cords”). As András Bácskay (2006) proposes, it is just “both physical complaints, pains, that is symptoms, and illnesses were perceived as messages from deities.” The pulse would be comparable to any omen terrestrial or celestial, without any relation to the functioning of the body. It would just have predictive significance.

Suppose we forget this “pulse” business and return to more mundane, down-to-earth notions. In that case, this sign or symptom should correspond to some usual or unusual aspect of the veins or some disturbing sensation the patient might complain about. The therapists’ interpretation would be based on the rope-like qualities of these structures, whether they are veins or something else.<sup>92</sup> This insight is consistent with what Barbara Böck (see above the introduction) considers to be the anatomical concept of the ancient Mesopotamians. The

<sup>89</sup> Interestingly, this description evokes a spasm or tic of the hemiface. The verb *râdu* might have been a good choice to describe an anarchic pulse (but is not used as such!).

<sup>90</sup> Wee J. 2019b 117-123.

<sup>91</sup> Bácskay A. 2018: 279 *šer’ânu*: vein, artery, tendon. Interestingly in No. 43 110-111: 21 the only reference to “veins” in his book on fevers concerns stains observed on flesh (*uzu*<sup>mes</sup>) and ropes (*sa*<sup>mes</sup>) of a woman with postpartum complications. Under the translation of artery Bácskay, in text No. 12 (p. 57), quotes the first lines of UGU I (BAM V 480+ p. 48ff.) which will be seen later under the paragraph 8.2.3.

<sup>92</sup> This would be in line with the theory that Sa-gig (*Sakikkû*), the treatise on medical diagnosis and prognosis refers to a bundle of signs or the collection of signs that a sick body presents.

sinews and blood vessels form a net that connects and holds together the different components of the body. This conception ties in with Gioele Zisa's (2021, 117-121) arguments about how demons and witchcraft cause impotence. They slacken and bind the ropes (*šer'ânû*) and strings (*qû*) of the body and thus cause weakness and impotence. For him "the action of the witch is expressed by being tied up, unable to act according to one's own will and being controlled by powerful dark and evil external forces."

Another "down to earth" aspect of the measurement of the pulse is that there is nowhere in the medical texts (or, other kind of texts) a quantified or explicit qualitative estimation of this pulse (or of the normal heartbeat). Of course, it can be argued that this type of information was passed on orally or that these documents have not come down to us. But I would say that this oral tradition has a lot to offer when it comes to hiding the dirty laundry under the carpet! The Mesopotamian scholars have a good reputation concerning mathematics and metrology. Nevertheless, we must consider that their time measures were approximate (length of night hours was different from day hours). They used water clocks that were not precise (see Fermor J., Steele J. 2000, 210-222 or Smith S., 1969 77 for an optimistic evaluation of short-time measurement with "sinking bowls"). We must ask ourselves why they would be interested in the pulse. What were they trying to find? In the medical texts, and even in all the written documentation (at least the ones I know, although I confess I am far from mastering all of it), there is no beginning of an answer, whatever their format.

When we try to explain the signs described by the ancient physicians by a deviation from the proper work of organs (in this case the body cords), it raises the question of whether the ancients actually had a conception of the normal functioning of the different parts of the body. Were their notions of pathology based on the various and sundry sufferings that men could experience, or were they looking for deviations from the normal functioning of body parts and in particular of internal organs? This is in line with what I had already written in 2000 on *šer'ânû*:

It is understandable that, according to the interpretation given to *šer'ânû*, the medical practice would have been very different: the practitioner was content to question his patient, to scrutinize him, and *šer'ânû* was something easily visible (or a disagreeable sensation); or he was conducting a clinical examination with palpation, pulse check, and *šer'ânû* corresponded to some internal, unapparent affection. In the first case, the practitioner was a scrupulous, methodical, attentive, but passive observer; in the other hypothesis, he became active, had a physiopathological theory on the internal origin of diseases, and looked for evidence through his clinical examination.<sup>93</sup>

I leave the reader free to choose his interpretation on the subject.

### **7. *Zi tebû* and *šer'ânû* a medical theory about pain or the comeback of throbbing?**

Apart from *alâku* another verb, *zi, tebû* has been connected with pulse.

<sup>93</sup> Attia A. 2000, 49.

### 7.1. Physiognomic texts

Assyriologists are keen on pulse theory, and another verb alerted them: *tebû* to get up or rise could also designate the pulse. CAD T 318 *tebû* (9) lists examples of this meaning, and AHW 1343a proposes the same translation: “pulsieren (Adern), hämmern (Schläfe)”.

The first argument against this theory is that this particular feature of the *šer'ânu* is the theme of a tablet with the following incipit “*Šumma šer'ân pūt imittišu ittenebbi*, Wenn der Muskel auf der seiner Stirn rechts zuckt” which is part of the treatise on physiognomy (TBP 49, AMT 61/8).<sup>94</sup> This tablet is incomplete, but it appears that all the “cords” of the body are mentioned from head to toe. A prognosis is given for each body part’s left and right sides, which is typical of the omen literature. The exhaustive way of listing these body parts must not make us forget that this unusual aspect of the strings was visible without difficulties and was quite commonly observed. Fritz Kraus (followed by Barbara Böck) believed that this *tebû* particularity was twitches or jerks of the muscles (ihm zuckt). But then it is difficult to understand the case: “*šumma šer'ânu* (diš sa) *šuburrišu* (dūr-šú) *ittenebbišu* (zi.zi-šú) *muruš šuburri mariš* (dūr.gig gig). If a *šer'ânu*(s) of his anus is protruding/twitching<sup>95</sup> it is an anal disease.”<sup>95</sup> In this case, the most likely aspect is enlarged veins, probably hemorrhoids. And most significantly, the tablet lists the venous bulges in different lower limb parts.<sup>96</sup>

This finding is compelling in eliminating the equivalence of *zi tebû* and the pulse. It is a matter of significant visibility of the venous network and probably, as one often sees in sportsmen, of the veins being especially in relief.

**7.2. We must turn to the medical texts** where the meaning could have evolved towards something else. We find cases where obviously the veins are salient:

#### 7.2.1. In *Sakikkû*.

Sa-gig tablet 4: 98 “If the veins on his temples, on the right and left, are raised (and) black [...] he will die.”

Sa-gig tablet 14: 66 “If the veins/tendons on his upper right thigh are raised (and) black: on the third day he will die.”

On the temple, the visible cord-like structures are veins. Their abnormal colouring indicates a particular appearance of these veins. Here protrusion or bulge is an appropriate translation of *tebû*. Regarding the opposite phenomenon, *šapûlu*, the thigh, upper or inner thigh veins or sinews can be observed (depending on body shape and muscularity). They would be easily visible if protruding.

In *Sakikkû*, most of the descriptions of *šer'ânu* seem to be related to the physical aspect of these anatomical structures: colour, course under the skin (like in Sa-gig tablet 4: 112 and 113 where the description differentiates between veins crossing and being straight or parallel). On the other hand, the succession of cases in which prominent veins are followed by “going” veins (e.g., Sa-gig tablet 4: *tebû* 97-99, *alâku* 100-106) could support that the two situations are similar (as in the Old-Babylonian text published by Andrew George 2013, 85-89, text 15).

<sup>94</sup> Böck B. 2000, 234-237.

<sup>95</sup> Böck B. 2000, 266 (TBP 22 i 21') *ahû*-Tafeln II: 25)

<sup>96</sup> Böck B. 2000, 268: 54-55; 270: 63-72. The interpretation by twitches in the muscle is sometimes difficult for her in view of the anatomy (l. 67-68 sa *ki-šil*), so she then translates: die Vein seine Knöchels ihm pulsiert.

Of course, several descriptions are challenging to classify e.g. Sa-gig tablet 13: 25 “When the top of his belly is hot, and the veins in his temples, hands, and feet are raised, (and) his eyes are heavy”. I agree with Eric Schmidtchen (2000, 530) “erhoben sind” and interpret this sign as an observable sign. But it can also be a “functional” symptom suffered by the patient if we consider that the two types of symptoms (*tebû* “rising” and *kabtâšu*, “it’s being heavy”) are in the same vein (no pun intended).

It is worth noting that this exaggerated visibility of prominent veins is described in the *Sakikkû* treatise in a context of increased temperature (local or general).<sup>97</sup> Other pathological manifestations of this fever may be added to this picture. For example:

Sa-gig tablet 3:55: if his head is hot, the veins of his temples, hands, and feet together ‘protrude’ his feet to his knees/legs are cold, the tip of his nose is black, the sides of his fingers are covered with yellow-greenish, the inside of his eyes is covered with yellow-greenish and white, his eyelids are (on) both (sides) gripped/seized, <sup>break</sup> [ ... ] the breath in his nose is seized, his breath comes out through his mouth: it made death rise in his throat [ ... ]

This description includes an accumulation of symptoms of different kinds: fever or cold can be experienced by the patient or appreciated by the doctor’s touch, colour changes are witnessed by an observer, and difficulty in breathing is disturbing the patient. It is difficult to say whether the “uplift” of the veins results from the doctor’s examination or the patient’s complaint.

The pathological condition of “being raised” (*tebû*) seems to be an observable sign rather than pulse or pain sensation, even though it is well known that during fever the pulse rate increases.

## 7.2.2. In the therapeutic texts.

### 7.2.2.1. A particular pain.

In the therapeutic texts the meaning seems to have evolved: the modification of the appearance of the thread-like structures has given way to a “subjective” symptom, *tîb šer’ân nakkapti*, related to a particular pain that had to be appeased. The verb *tebû* has various meanings, to “get up, to rise, to begin, to attack, to emerge,” while *tîbu* means an “attack, rising,” and for CAD T 386, “throbbing” or for AHw 1355b, “etwa aufzucken von stechender Schläfe”. Worth noting is that, as Marten Stol remarked (1989, 163), cases are found with just *tîb nakkapti*, which could be the short form of *tîb šer’ân nakkapti*, so the cords disappear, leaving the temples alone. We find this similarity in the next quotes:

BAM I 11:19<sup>98</sup> *ana tîb šer’ân nakkapti nuhhi...*

BAM V 482 ii 2 // Jastrow r 3<sup>99</sup> // BAM I 9: 61 *ana tîb nakkapti nuhhi ...*

“To relieve a surge of pain in the cords of his temple or for a surge of pain of the temple. ...” even if the treatment is not complete in BAM I 11 it seems to be identical or, at least, comparable to BAM V 482’s (and parallels).

<sup>97</sup> Schmidtchen E. 2013, 259-260, tablet 3: 53, 55-58: “the head (or head and belly) is hot, and as a result the venous cords of the temples, +/-arms and legs are prominent.”

<sup>98</sup> For BAM I 11 see Heeßel N. 2009, 23-28.

<sup>99</sup> For “Jastrow” see Jastrow M. 1913, 365-400, Scurlock JA.2003, 16-17.

In another context: BAM V 482 iii 40' "If someone, during the grip of the hand of a ghost, presents continually a rise in pain / surge of pain in his temple, to save/deliver him ..."<sup>100</sup>

A clue can be provided by a text concerning the head subject to "a surge or a rise in pain" or as in JMC 5 translated by Martin Worthington (2005, 21) and followed on NinMed "throbbing":<sup>101</sup>

BAM V 480 iv 9 If a man's head *throbs* constantly (*it-te-né-ba-aš-šum*): *mušītu*-stone, *muššāru*-sardonyx, *takkassu*-stone, *sāmtu*-carnelian from (the land of) Marhaši, dark *šurru*-obsidian, *ḫulālu*-agate, AN.ZA.GUL.ME-stone (and) *ašpû*-chalcedony – [you string] these eight stones on (a twine composed of) red (and) white wool twisted together, you tie it [to] his temples, and then he will get better.

What should be understood is that this translation points to migraines: unilateral headaches characterised by the pulsating or throbbing nature of the pain. So translating "throbbing" in this context orientates towards migraine (although there are other causes of "throbbing," which are rarer and not worth detailing). To use "throbbing" is a hidden "retrospective diagnosis." Significantly, the treatment is applied to the temples, where the unpleasant sensation originates. Nothing is sure about this sensation, neither a twinge, a throbbing, a tension, a sudden pain attack, or a progressive rise in pain. All these translations are tentative approaches to the aching temple.

The fact that the treatment for calming the "rise in pain / surge of pain" of the temple cords parallels a case of the same type of pain in the temple or in the head supports Marten Stol's hypothesis. The absence of cords, and therefore, the absence of a visible anomaly on the temples or in the head confirm the shift in the meaning of *tēbu* from prominent veins (or sinews) towards a painful sensation.

#### 7.2.2.2. A pain associated with watery eyes.

Several clinical descriptions concern this *tebû* pathology of the cord-like veins of the temple associated with watery eyes. This pain, given the dictionary definition could be a pain which gradually increases, or a sudden and intense onset of pain which "attacks". This meaning is in keeping with the context of this society, where people are steeped in stories and mental representations of attacks, whether human or supernatural. It could also be, with reference to the translation in JMC 1 (tension):<sup>102</sup> dilated and bulging veins can give the impression of having tense walls; the pain would then be a tension. It should be noted that this translation would then allude to so-called tension headaches and this therefore seems anachronistic.

BAM I 6: 1-6: if the venous cord/vein of a man's right temple is affected by/has (*irašši*) a surge of pain (or a rise in pain) so that [his right eye] contains (*ukāl*) tears: you cook in milk *sahlû*-cardamin, *puquuttu*-pungent ch[ardon], you make into a soft dough, (and) bandage; if it

<sup>100</sup> As mentioned earlier for a transcription of BAM V 482 alone (without parallels) see NinMed <http://oracc.org/asbp/ninmed/P365744>. There will be also a possibility to compare with a slightly different translation.

<sup>101</sup> See Worthington M. 2005, 6-43, and <http://oracc.museum.upenn.edu/asbp/ninmed/pager/12/10/2022> with bibliography.

<sup>102</sup> Attia A., Buisson G. 2003.



does not stop, you crush and sift *sahlû*-cardamin, *puquuttu*-pungent ch[ardon] (and) *pappas buqli*-malt mash, you make into a soft dough in *kasû*-tamarind water (and) you bandage.

BAM I 6: 7-11: If the venous cordage/a vein of a man's left temple is affected by/has a surge of pain (or a rise in pain) so that/and his left eye contains (*ukâl*) tears: you cook in *tâbâtu*-vinegar *hašû*-thyme, *kasû*-tamarind, *qêm labti*-parched grain flour (and) flour of thorny-*qêm dadâni*, you make into a soft dough, you bandage.

BAM I 3 iii 20-23<sup>103</sup> // AMT 20/1 ii 13'-14'<sup>104</sup> // BAM I 35 iv 1'-3' If the venous cordage/a vein of a man's right temple is affected by/has a surge of pain (or a rise in pain) so that his right eye contains (*ukâl*) tears: you make into a soft dough, in *kasû*-tamarind water cooked *sahlû*-cardamin, *hašû*-thyme, *kasû*-tamarind, *lišân kalbi*-dog's tongue, you sprinkle with *qêm labti*-parched grain flour; you shave his head, you bandage, and he will recover.

BAM I 3 iii 24, AMT 20/1 ii 15' // BAM I 35 iv 4' If the venous cordage/a vein of a man's left temple is affected by/has a a surge of pain (or a rise in pain) so that if his left eye contains (*ukâl*) tears: same application.

BAM I 3 iii 25-27, AMT 20/1 ii 16'-17' // BAM I 35 iv 5'-7' If the venous cordage/a vein of a man's right and left temples is affected by/has a a surge of pain (or a rise in pain) so that his eyes, both of them, contain (*ukâl*) tears: you make into a soft dough, either in *šikaru*-beer or in goat's milk, cooked (or crushed) *sahlû*-cardamin, shave his head, apply [and he will recover].

What can be said about tearfulness? It does not seem to be such a dangerous condition. One interpretation is that pain is so bad that it induces weeping or that it brings tears to the eyes. As a treatment applied to the temple with the purpose of alleviating this pain was possibly how the ancients understood it. On the other hand, it could be lacrimation caused by painful eye inflammation, as is often the case. A detail can be pointed out: the term employed for the eyes is *kullu*, *ukâl*, to contain tears. It is not to shed tears as in BAM V 480 i 3 (*šub.šub-a, ittanaddâ*). This expression is confusing, it is normal for eyes to have tears since even to cry is a normal function. But here it is a pathological sign. We must therefore admit that tears are in excess and overflowing. What is the problem? Abnormally high production? An unusual feeling of "wet" eyes? An abnormal reaction as in the injunction "men don't cry when they get hurt?" It's hard to make up one's mind.<sup>105</sup> However, in the Talmud, excessive tearing is said to lead to blindness (Preuss J. 2004 [1911, 1978], 70). This theory may have its origin in Greek medicine, but it could also come from a Mesopotamian concept. In the tractate Avodah zarah 28b of the Babylonian Talmud, there is a discussion between the sages to decide if it is permitted to treat with blue ointment eyes during Shabbat. In several cases, it was permitted, the reason being: "The reason is that the tendons [*shuraynei*] of the eye are dependent upon the valves of the heart." One of the protagonists asks what ailments reveal a great danger for life. The answer is: "Abnormal discharge; the sensation of pricking; blood flow from the eye;

<sup>103</sup> For BAM I 3 see Martin Worthington 2066, 18-48.

<sup>104</sup> For AMT 19+ see NinMed website <http://oracc.org/asbp/ninmed/P396343>, transcription, translation and bibliography.

<sup>105</sup> One pre-Socratic Greek physician, Empedocles, according to Huard P. and Grmek M. (1977-1978, 927) believed that all the secretions of the body, including tears came from putrefaction. [https://www.persee.fr/doc/ephe\\_0000-0001\\_1977\\_num\\_1\\_1\\_6441](https://www.persee.fr/doc/ephe_0000-0001_1977_num_1_1_6441) (accessed 26/10/2022)

excessive tearing; and inflammation; and the onset of infection.” This list excludes “the final stages of a waning infection that is mostly healed, and the opening of the eye.”<sup>106</sup>

The translation in Sefaria is misleading, and according to Mark Geller (personal communication) the transcription, the Akkadian equivalence, and the translation of the main “medical” terms is as follows:

d-Mr Šmw'l hy' hhy' 'mt' d-hw'y by Mr Šmw'l d-qdh' lh <sup>C</sup>yn' b-šbt' šwwh' wlyk' d-'šgh bh. p<sup>q</sup>c' <sup>C</sup>yn'. Imhr nqp Mr Šmw'l wdrš: <sup>C</sup>yn šmrd' mwtr lkwħlh b-šbt m'y t<sup>C</sup>m'? d-šwryyny d-<sup>C</sup>yn' b-'wbnt' d-lyb' tlw

(A ruling of) Mar Samuel (2nd cent. CE) there was a certain maiden in Mar Samuel's household whose eye was *pierced* on Shabbat. She cried out but there was no one who paid attention to her. The eye burst. The next day Mar Samuel went out and taught, “an eye *causing trouble* [N.B. *šmrd* is misunderstood for Akk. *šumruš(at)*, since the traditional translation (eye) that ‘rebelled’ makes no sense] is permitted to be treated with *kohl* (= Akk. *guhlu*) on Shabbat.” What is the reason? Because the tendons (*šwryyny* = Akk. *šerānū*) of the eye are suspended from the “fingers” (*'wbnt'* = Akk. *ubānātu*) of the interior (*lyb'* = *libbu*) [*scil.* of the eye].

One can only remark the correspondence of Aramaic and Akkadian terms. The treatment with kohl, an antimony paste, *guhlu*, is used frequently in eyes diseases (see CAD G 125, AHw 296, Geller M. and Panayotov S. 2020, 32, 247, 254, 271, with bibliography)

This passage must have been influenced, if not taught, by sages with direct knowledge of Mesopotamian medical texts.<sup>107</sup> The use of *shuraynei*, which is not attested elsewhere in the Talmud, is, if not proof, at least a serious clue of the influence of Mesopotamian medicine. The text is complex and may be corrupt, but it reveals that teaching reveals the danger of several eye ailments. The relation of eye ailment and the “fingers, *ubānāti*” of the “inside” which are “hanging out” is compelling and interesting. The real meaning of this finger is mysterious, it could be a tissue coming out of the eye, it could be an allusion to the structure called *ubānu* in hepatoscopy. It is possible that this Talmudic text is the written version of the Babylonian scholars’ oral teaching for their students.<sup>108</sup> However, the successors of the Talmudic sages did not recognise the Akkadian origin of the vocabulary and interpreted the passage quite differently. According to Preuss J. (2004, 72) eyes were connected to heart through understanding: “perception is a matter of comprehension.”

The Greek author of Hippocratic corpus II had similar ideas: “There is danger when the pain is accompanied with tears for from such hot and salt humours ulceration of the pupil or lids may be apprehended.” But later on he explains clearly the infectious context: “Should the

<sup>106</sup> [https://www.sefaria.org/Avodah\\_Zarah.28b.12?lang=bi&with=all&lang2=en](https://www.sefaria.org/Avodah_Zarah.28b.12?lang=bi&with=all&lang2=en) accessed 09/10/2022. Interestingly in <https://halachayomit.co.il/en/default.aspx?HalachaID=2018> 09/10/2022 the translation of *shurainii* is cord.

<sup>107</sup> I want to thank Mark Geller for helping me find and understand the references and guiding me in the subtleties of the Babylonian Talmud and the Akkadian terminology.

<sup>108</sup> Interestingly, in this passage of Avodah zarah 28b Abbaya says he received a medical education from *ummānu* which is the title of Babylonian experts. See Mark Geller’s comments (2004, 8) about this fact, Geller explains that the text was corrupt, mistaking the words mother (*ummu*) and expert (*ummānu*).

sordes<sup>109</sup> be of a greenish or livid tinge, the tears abundant and scalding, with heat of the head, and pain extending from the temples and fixed in the eye, preventing sleep, ulceration will ensue in the eye, with danger of its bursting.”<sup>110</sup>

It is possible, since tears are salty, that they have been associated with the bitter and dangerous aspect of bile and poisons.<sup>111</sup> This is only a very hypothetical proposition which, if it had any basis, would have survived both in the Talmud and in Greek medicine.

### 7.2.2.3. A pain associated with **buzzing ears and watery eyes**.

ringing in the ears can be added to the clinical description:

BAM V 493 i 7'-10' // AMT 14/5 ii 6'-9': “*Šumma awīlu šer’ânû nakkaptišu ša imitti u šumêli kīma šibit eṭemmi tebûma uznâšu išassâma u inâšu dimta malâ*, If someone, the cords in his temples to the right or left, as in the seizure of a ghost, give a surge of pain (or a rise in pain) so that his ears roar and his eyes are full of tears (*malâ*).

*Šumma awīlu šer’ânû nakkaptišu tebûma in imittišu dimta ukâl inâšu dâma malâ panûšu iššanundû* If someone, the cords of his temple give a surge of pain (or a rise in pain) so that his right eye contains (*ukâl*) tears, his eyes are full of blood (*malâ*), and his face spins.

The combination of headache and tinnitus is standard, with various causes. In these examples, crying seems to be correlated with severe pain. It should be noted that the second case is more difficult to situate. This type of association is found in the literature but concerns rare diseases that cannot be retained in the framework of ancient medicine. This association can, of course, be explained by commonplace disorders (e.g., hypertension, subconjunctival haemorrhage, and tinnitus). However, it involves disparate elements which are not likely to be associated systematically.

7.2.3. It is conceivable that a particular sickness or ailment has been called “**zi sa sag.ki tīb šer’ân nakkapti**” or “**zi sag.ki tīb nakkapti**”. The absence of a possessive suffix after sag.ki points in this direction.

Different descriptions associate fever and *tīb nakkapti*:

7.2.3.1. A clinical case presents zi sag.ki as a diagnostic or a consequence of fever: BAM V 480 iii 8<sup>112</sup> “*šumma [awīlu šêta hamiṭma šarât] qaqqadišu išahhuh tīb qaqqadi irtanašši*, if someone is burning with heat-of-the-sun and his hair is falling out, it means that/and he is affected continually by the temporal-surge-of-pain.” Headaches occur frequently during fevers, whatever the origin of the fever. The physician links it to a head problem through the mention of zi sag.ki. Consequently the treatment is applied on the temple after shaving and cooling the head.

7.2.3.2. The clinical case starting UGU I is particularly relevant:

BAM V 480 i 1-3 // Jastrow:1-2 // BAM I 3 i 1-2 // New UGU: 1-3: “if a person, his skull contains heat (and if) he is affected by a sudden and intense surge of pain from the cords of his temple which “attacks” in such a way that it bruises (*i-dak*) his eyes, his eyes are troubled by

<sup>109</sup> Kind of sooty, blackish deposit. Here it is possibly a dirty deposit.

<sup>110</sup> <https://oll.libertyfund.org/title/coxe-the-writings-of-hippocrates-and-galen> (accessed 26/10/2022)

<sup>111</sup> For the links between bile and poisons see Troels Arbøll 2021, 76-83,

<sup>112</sup> Texts parallel allowing a reconstruction of this case: BAM I 3 ii 27, BAM I 9: 23, Jastrow: 18.

darkness, cloudiness, confused vision, Blackberries-granulations, (or) twists-*qûqânu*, and keep shedding tears (*šub<sup>meš</sup>, dimâti ittanaddâ*.)”

These lines constitute the very beginning of the first tablet of the Ninivite therapeutic compendium. It concerns a pain in the temple associated with heat inside the head. This particularly sudden and intense onset of pain “attacks” and “kills” the eyes by triggering various visual impairments and tearing. The pain is worded differently in the different versions of the text:<sup>113</sup>

in BAM V 480 i 1 sa zi sag.ki tuk-*ma*, the cord (of his temple) is affected by (has) the intense surge of temporal pain, so that ...

in BAM I 3 i 1 sa sag.ki-*šû* zi.[zi<sup>2</sup>, his temple cord [constantly] gives him an intense surge of pain,

and in new UGU 1 zi sa sag.ki tuk.tuk-*ši* sa sag.ki-*šû* igi<sup>II</sup>-*šû* gaz, he (the patient) keeps being affected by (literally: having) the intense temple cord surge of pain, his temple cord is breaking his eyes (in this way:)

It must be assumed that the clinical problem is the same, no matter how it is expressed which is a problem for the identification of sa zi sag.ki as a disease.

The translation of i-DAK, to bruise is controversial (see Gilles Buisson 2021, 11-19). Let’s agree to translate zi – *tîb* by having a sudden and intense onset of pain which “attacks” (or a rise in pain), which is consistent with the meaning of *tebû* and *tîb* (*tebû* CAD 314-315 T 4e “said of pain, evil”, AHW 1342 7 ‘ist auf, steht, ist unterwegs’, *tîbum* AHW 1356: “Aufstehen, Erhebung, Aufmarsch, Angriff,” CDA 405, “arousal, attack and jerk, twitch,” CAD T 386, “attack, uprising (but also throbbing)”. If one accepts that this attack of pain has a repercussion comparable to what one sees in war, at least in a symbolic way, with bruises, wounds and death, one can assimilate it to a clinical case of Sa-gig tablet 4: 34 “If his temples hurt him (*ikkalâšu*), (and) smash him (to death or destruction *umahhašûšu*), the cords of his eyes sting him (*uzaqqatûšu*), (and) the cords of his neck hurt him (*ikkalûšu*), (it is due to) Hand of a Ghost.” It can also support the therapeutic text (UGU II – CRANIUM II) AMT 20/1 iv 9 “if a person, during the grip of a Ghost his temple [smashes him (to death or destruction)], and the cords of his eyes sti[ng him, (and) the cords of his neck hurt him].<sup>114</sup>

Another quote from a literary text (SEAL n°1751) illustrates the use of this verb in an exaggerated figure of speech: “you slap (lit. kill) my cheeks with the palm of my own hand! *i-na hu-ma-at(šu-a) ra-ma-ni-ia ú-sú-uk-ki-ia ta-da-ak* (George A. 2009, 78-112, n°14: 5).

### 7.2.3.3. Particularities of this ailment:

The physician tried to calm the pain and the fever before it became too strong. It seems that he believed that to relieve the first symptoms could prevent the onset of complications:

BAM VI 578 iv 47<sup>115</sup> // AMT 14/7: 1 // BAM I 66 r 4’ “If a man has an acute fever (and) is sick with the intense temple surge of pain /the rise in pain in the temple (zi sag.ki gig, *tîb*

<sup>113</sup> See Buisson G. 2021, 19-20, 22-24

<sup>114</sup> Cf. Scurlock JA. 2006, 351 no. 118 and NinMed *sub* AMT 19/1+. Interestingly René Labat in TDP 37: 35 translated “lui battent”. His translation implies a pain that strikes, hits but does not necessarily destroy. The temple suffers an all-consuming pain, a second verb could add a sensation or reaction worse than that pain, hence the idea of destruction or death.

<sup>115</sup> For BAM VI 578 transcription, translation and bibliography see NinMed: <http://oracc.org/asbp/ninmed/P393735> (accessed 28/10/2022)

*nakkapti maruṣ*), before it becomes severe for him, in order to heal him”. It should be noted that the use of *gig, maruṣ*, with *zi sag.ki* is in favour of a specific disease or symptom for *tīb nakkapti*.

The pain *tīb nakkapti* or *tīb šer’ân nakkapti* is the type of pain that occurs with a high fever. The characteristics of this pain must therefore differ from those of migraine (which occurs outside the context of fever); it is therefore likely to be constant and not throbbing. It is possible that it sets in quickly and increases in intensity (if one follows the definition of the verb *tebû*). It is then possible that the verb *tebû* describes the way in which the pain appears or evolves and not its pulsatile or steady character.

This pain also appears without fever or heat in the head. Several complications for *tīb nakkapti* are described: *rimûtu*-paralysis and *šimmatu*-numbness:

BAM V 482 i 49’, 51’ // AMT 20/1 i 36’, 38’ “If a man is affected (has) with the intense temple surge of pain /the rise in pain in the temple, so that/and he is (also) affected with *rimûtu*-paralysis”

BAM V 482 i 54’// BAM I 11: 34 “[If a man is affected with a rise in pain in the temple, so that/and he is (also) affected with *šimmatu*-numbness.”

In *Sakikkû* tablet 4 we find the equivalences:

Sa-gig tablet 4: 114. If he is affected with (has *iraššîma*) the intense temple surge of pain /the rise in pain in the temple (*tīb nakkapti*) and moreover his skin<sup>?</sup> devours him with pain: Hand of a Ghost.

Sa-gig tablet 4: 115. If he is affected with (has *iraššîma*) a rise in pain in the temple (*tīb nakkapti*) so that/and his hands and feet go numb (*šimmatu*): Hand of a Ghost.

Sa-gig tablet 4: 116. If he is affected with (has *iraššîma*) a rise in pain in the temple (*tīb nakkapti*), *šimmatu*-numbness, and *rimûtu*-paralysis: Hand of a Ghost.

It is fascinating to find these descriptions: *šimmatu* is most probably an abnormal sensory disorder.<sup>116</sup> This unpleasant sensation is a hallmark of scorpion sting pathology<sup>117</sup> but it also occurs independently of any bite. It is hard to give an exact equivalent to it: the scorpion bite is painful and causes numbness or tingling around the bite area. It is difficult to translate precisely this sensation disorder. Numbness is a good approximation, but paresthesia or dysesthesia, which combines a painful sensation with numbness,<sup>118</sup> would be more appropriate, if these terms did not carry a connotation of modern medical terminology. Sylvia Salin (2018, 27-30) has convincingly pointed out that this term also conveys a notion of

<sup>116</sup> Cf. Scurlock JA., Andersen B. (2005, 289-290).

<sup>117</sup> Worth noting the allusion to the poison/venom (*imtu*) of *šimmatu* in *muššu’u* VIII: 18-19: “so that you get out, your poison (*imatka*), *šimmatu*, it gets out, it gets out, *šimmatu*, your poison!” (Böck B. 2007, 269).

<sup>118</sup> See e.g., BAM V 482 iii 61-64: “If a man keeps experiencing (*irtanašši*) headache (*sag.ki.da.ba*), if his eyes darken, if his muscles on his both sides (*uzu*<sup>II</sup>, *širâšu*) become numb (*išammamâšu*) and sting (*uzaqqatâšu*), if his belly is swollen, if his hands and feet become numb (*išammamâšu*) and sting (*uzaqqatâšu*), if his knees are sore, flaccid and helpless, that man is taken by a persistent disease that overpowers him.” The association of the numbness and the sting evoking the scorpion is particularly telling.

spasm or spastic palsy, which accounts for the occurrence of this condition when muscles are said to be stiff or when this ailment makes walking difficult (cf. Salin 2018, 29). It is actually well-known that paralysis and numbness are characteristic neurological symptoms. It seems that the ancient physicians understood it already. In these cases, it is difficult to determine how the temporal ache was. In migraines and other neurological conditions in which the headaches have various severities, these symptoms can be observed.

#### 8. *Zi tebû, dab şabâtu, gu<sub>7</sub> akâlu, du alâku, what a hassle! Or in French quelle prise de tête!*

We are confronted with a complicated problem that goes in different directions: the raising or bulging of the cords of the temples would be equivalent to that of the temples. This situation has given rise to the name of a symptom or pathological condition: “*zi sag.ki – tîb nakkaptî*” or “*zi sa sag.ki – tîb şer’ân nakkaptî*”. This intense temple surge of pain (attributed to a protruding cord of the temple?) in the therapeutic texts could be of the same order as its seizure or griping in the *Sakikkû* manual.<sup>119</sup> To complicate matters, we have seen that in the Old-Babylonian *Sakikkû*, the “bulge (*tebû*)” of these cords could be similar to their “going (*alâku*).” Knowing that headaches are the main complaint concerning the head, these verbs could refer to several forms of it. Other pathologies, such as fever or skin conditions, are usually described explicitly. Headaches may be mild or severe, even disabling. They may be accompanied by ocular, neurological, or other manifestations. Conversely, headaches may complicate eye, tooth, and ear diseases, fever, or other problems in different parts of the body. It is worth noting that migraine is nowadays a common disease in the population, although it is less frequent than “tension headache”.<sup>120</sup> Of course, we have no idea of the frequency of these diseases in ancient times, but it is a fact that we must keep in mind. Admittedly, all these terms are likely to refer to headaches. However, why did they not use *akâlu*, *gu<sub>7</sub>*, the term usually employed for pain, more often? The answer is probably that it had specific characteristics that required appropriate verbs depending on the context.

In therapeutic and prognostic texts, the association of pain in a temple with homolateral ocular complaints has been identified by ancient physicians. This association occurs in “real life” and not only in theory. If we use retrospective diagnosis, we can find various corresponding pathologies. It should be noted that the practitioners did not associate the disorder in one temple with that in the contralateral eye. From a retrospective diagnostic point of view, it can be said that this type of association is rare and would probably be due to chance, with no correlation between the two disorders. The practitioner (*asû* or *âšîpu*) did not fabricate all possible associations as in divinatory interrogations. He merely observed and noted the genuine pathological associations. It is, therefore, possible to deduce that the doctor described real cases and not “theoretical” cases created from scratch. Using these descriptions to determine which type of pain corresponds to our verbs is tempting.

The medical practitioners may have selected one by one the symptoms that can be associated with headaches. They established a diagnosis/prognosis and effective remedies for each. It is

<sup>119</sup> Clear references to /dab/ with a painful connotation come from examples where this condition is followed by the utterance of cries of pain (Sa-gig tablet 4: 8-10 or BAM V 482 iv 49’). For an analysis of /dab/ in different pathological contexts see Salin S. 2015, 325-329.

<sup>120</sup> <https://www.ffn-neurologie.fr/grand-public/maladies/la-migraine> accessed 01/11/2022.

also possible that they had a “diagnostic tree” giving a checklist of symptoms to look for in headaches, each of which would point to other signs.

We will review different associations of temple and eyes conditions:

### 8.1. Surge or grip of pain in a temple cord with watery eyes

We have seen that a pain described by **zi, *tebû*** can be associated with watery eyes, full of tears, or with tears that overflow. But in *Sakikkû* (e.g. in Sa-gig tablet 4: 73-75) the same clinical case begins with a pain described by *dab šabiṭ*, grip, seizure or grasping.

Sa-gig tablet 4: 73-75 If the venous cordage/a vein in the right/left/both temple has gripped him with pain (*šabissuma*) so that his right/left/both eye contains tears (*ukâl/ukallâ*): Hand of a Ghost.

Interestingly a similar pathology is found in the therapeutic texts but it is the temple instead of the vein of the temple which is gripped or seized. As seen before (§8.2.2.) Marten Stol (1989, 163) proposed that these affections are identical:

BAM V 482 ii 20-21 // BAM I 9: 14-15: If a man’s right temple is gripped (by pain, *šabissuma*) and his right eye contains (*ukâl*) tears: you mix together *sahlû*-cardamin, *qêm labti*-parched grain flour a b[lock<sup>2</sup> of] x (and) a block<sup>2</sup> of *buqlu*-malt make it into soft dough in *kasû*-tamarind water. You bandage to his temple; then, he will get better.

BAM V 482 ii 22-23 // BAM I 9: 16-17: If a man’s left temple is gripped (by pain, *šabissuma*) and his left eye contains (*ukâl*) tears, you crush (and) sift *sahlû*-cardamin (and) *hašû*-thyme, cook it in *šikaru*-beer, make it into soft dough. You bandage his temple; then, he will get better.

BAM V 482 ii 24-25 // BAM I 9: 18-20: “if both of a man’s temples are gripped (by pain, *šabtûšuma*) and both his eyes contain (*ukallâ*) tears: you make a soft dough with *sahlû*-cardamine *hašû*-thyme, *kasû*-tamarind, *qêm labti*-parched grain flour (and) *pappas buqli*-malt mash together in a *diqâru*-pot in *kasû*-tamarind water. You fasten (like a bandage) on his temples (with the mash);<sup>121</sup> then, he will get better.

The change of verb is apparently due to the fact that in *Sakikkû* “*zi, tebû*” generally corresponds to an anatomical aspect of the body’s cords and to avoid any misunderstanding the verb *dab šabatu* is preferred to describe the pain. In *Sakikkû*, the writer may have preferred a verb with a connotation of a mode of action, in this instance of taking hold by the headache. This aspect will be reviewed later. According to the different translations of *tebû* in the dictionaries, this pain could have the characteristic attacking, setting in abruptly and rising in pain. It could, as we thought in 2003 (Attia, Buisson 2003), be linked to the dilation of the blood vessels. Their raised, dilated appearance could have given an impression of tension, or pressure. *Dab = šabātu* has no clear and straightforward meaning; it may correspond to pain but also to the fact that a part of the body is involved in a pathological state. As it refers also to the condition *sag.ki.dab.ba* which is certainly a headache, its use for ache is justified. The character of this pain, however, remains to be understood. The possibility of changing verbs

<sup>121</sup> For the translation of *rabâku* by “mash” see Cadelli D. 2000, 111 note 25: she had translated by “bouillie”. As Danielle Cadelli’s thesis has not been published and is difficult to access, cf. a translation of her note in this issue (Cadelli D. 2021, 12-13).

would tend to prove that the pain was intense and burdensome but that either the writer of the *Sakikkû* manual or the writer of the therapeutic texts did not feel the need to characterise it.

### 8.2. All-consuming/devouring pain in the temple and swollen watery eye

The association of **temporal pain and crying** is also described in therapeutic (BAM V 482 ii 62'-iii 4 // AMT 18/3: 6-7) and prognostic texts (*Sakikkû* tablet 4: 30-31) with another pain verbs, i.e. *gu<sub>7</sub>*, *akâlu*, devouring, or all-consuming pain. It is the most frequently used word to express the ache. Literally, this pain is referred to by the verb “to eat” and corresponds to a significant pain, giving an all-consuming sensation that can destroy the part of the body that feels it. However, this verb is used in so many different situations that it is impossible to know if it has retained this original meaning. More often than not, it may mean “hurting” without other overtones.

BAM V 482 ii 62' “If a person’s right/left temple is giving an all-consuming pain (*ikkalšuma*) so that his right/left eye is swollen (*naphat*) and sheds tears (*dimâti inaqqî bal-qi*).”

The intensity of the pain and the swelling of the eye are essential signs for disease classification (infection/inflammation *versus* foreign body/lacrimal duct damage/cephalalgia with lacrimation) and prognosis. The difference with the previous paragraph is the presence of an ocular pathology responsible for the symptoms. It points to a primary eye disease complicated by a headache. Given that pain is mentioned first, it can be assumed that its intensity has attracted the attention of the patient or the practitioner. Moreover, presumably, the eye is badly damaged, hence the choice of translating it as “all-consuming pain.”

### 8.3. All-consuming/devouring pain in the temple and eye shadow:

The association of pain in the temple and an eye shadow is found twice in the *Sakikkû* treaty:

Sa-gig tablet 4: 27-29 “If his right/left temple (both sides) gives him an all-consuming pain, and he has a shadow (*gissu = šillu*) on his right/left eye (both sides).” the prognosis is favourable in all three cases: he will be spared and will get better.

The same association is analysed in a tablet (Sa-gig tablet 16: 21-23) taking into account the symptoms according to their rhythm of appearance. The association pain-shadow in the eye is not found in BAM V 482 (or its parallels). Two possibilities are open to us: these cases are lost in a break or for the composer of the therapeutic compendium, the shade (*gissu = šillu*) was a purely ocular ailment.

In my article on eye diseases, the identification of this shadow had baffled me (Attia A. 2015, 88-89). I hesitated between a perceived shadow (a “symptom or functional sign”), a scotoma, or an amputation of the visual field and an opaque spot seen on the cornea (or behind the cornea) by the physician or the patient’s relatives (an inspection sign). In the article on Tobit’s blindness due to *leucoma* (Attia A. 2018, 48-51), I thought that *leucoma* might correspond to *šišîtu*, a white membrane covering the cornea, and not to that shadow called *gissu, šillu*.

It is likely that, as with us nowadays, the term “stain, shade” could refer to both the functional and the physical sign. In the case of an association with unilateral temple pain, corneal ulceration, inflammation inside the eye (different types of iritis), corneal edema, all of which



disturb the vision, are appropriate (these are quite common pathological conditions; there are, of course, other affections which might be adequate). Visual field amputation with headache may also be an option but requires an elaborate context (e.g. acute glaucoma, high blood pressure, or trauma). It is possible that the case described in Sa-gig tablet 16: 21-24 fits such a context “If he has been ill for 2 days and then appears a right/left/both side headache that devours him, his right/left/both eye produces an opaque spot”, the god responsible is named, and surprisingly, the prognosis is favorable. Given the variety of causes of visual spots or shades, it is impossible to establish the specifics of headache and, by extension, of *gu7*, *akâlu* in this configuration. The translation could be: “If his right/left temple (both sides) hurts him.” Nevertheless, like for headache and eye inflammation, the fact that pain comes first and that in the compendium chapters devoted to ocular diseases, this type of association is not found, this pain should be sufficiently significant to deserve this place.

#### 8.4. Gripping pain in the temple and bloody eye.

This case is taken into account both in the therapeutic texts (BAM V 482 ii 26-31, BAM I 3 iii 28-36, AMT 20/1 ii 3'-8', K 19766: 1'-7') and in the diagnostic prognosis series with *dab-su* (Sa-gig tablet 4: 70-72). Right, left, and bilateral involvement have the same cause and are treated by applications of more or less thick paste on the temple (the place of application is not systematically specified but is likely).

In the therapeutic text (BAM V 482 ii 26-31, BAM I 3 iii 28-36, AMT 20/1 ii 3'-8', K 19766: 1'-7'): “If a man his right/left/both temple(s) gripped him with pain (*dab-su*, *šabissuma*, *šabtâšu*) so that/and his right/left/both eye(s) is bloodshot (*ukâl*).”<sup>122</sup>

In Sa-gig tablet 4: 70-72 If the venous cordage/a vein of his right/left/both temple(s) grips him (*šabissuma*, *šabtâšu*) with pain so that/and his right/left/both eye(s) is bloodshot (*ukâl*, *ukallâ*).

There are so many causes of bloodshot eyes that it is impossible to know what type of pain it is. A red eye most often suggests that the cause is eye damage, especially when it is a unilateral condition. It may be a serious disease that requires specific treatment that the former doctor was not aware of (e.g. severe ocular hypertonia or inflammation of the anterior segment, iridocyclitis). Traumatic causes of ocular redness may be more or less dramatic, with at least a simple subconjunctival haemorrhage and moderate headaches.

#### 8.5 Gripping pain in the temple and all-consuming/devouring eye pain.

What about the association of two types of pain, one in the temple and the other in the eye?

Sa-gig tablet 4: 17 if his temple is gripped by pain (*šabtassuma*) and his eyes cords devour him with pain (*ikkalûšu*), hand of a Ghost.

The author has intentionally used two different verbs for pain in the temple and pain in the eyes. The pain takes control of the head and brings about a specific pain in the eyes. Clearly, pain is felt differently in the eyes and the temples. In this case, for the doctor, the use of “*dab*” has two meanings: one symptomatic, a pain in the head, the other “pathophysiological”: a disease of the head responsible for an eye ache. Even today, it is difficult for the patient to

<sup>122</sup> Worthington M. 2006, 30, Attia A., Buisson G. 2003, 13; NinMed <http://oracc.org/asbp/ninmed/P396343>

appreciate the respective responsibilities of these two body parts in the genesis of painful pathologies. However, eye disease is often at the forefront and responsible for headaches.

### 8.6. Must we turn to other associations?

The pain in the temple was described by *zi = tebû*, *dab = şabaṭu*, or *gu<sub>7</sub> = akâlu*. The eye complaint was a “*simplitia*”, i.e. it did not fit into a full clinical description but was quoted alone. It would seem that practitioners isolated each anomaly that made up a disease and gave a diagnostic and therapeutic lead based on that sign. If *dab = şabâtu*, is thought to correspond to a type of seizing or gripping pain taking control of a part of the body (see note 119), then this pain was probably strong or worrying enough to initiate the clinical case. The other types of pain were perhaps more descriptive, *zi = tebû*, as we have seen, could correspond to a pain that sets in by attacking suddenly and possibly increasing, the pain *gu<sub>7</sub> = akâlu*, was also strong and had to be imagined as devouring and destroying the part of the body where it set in. The study of temple pain + eye pain was somewhat disappointing in terms of identifying the qualities of head pain and determining whether the descriptions were of migraine, tension headache, neurological headache or temple pain due to eye disease (or based on other causes). We can also look at other associations to see if they provide a better understanding of headaches.

#### 8.6.1 Gripping pain in the temple complicated by vomiting:

This complication has opposite prognoses, if it is a migraine followed by vomiting, the disorders will disappear on their own without consequence, if it is a cerebral problem with intracranial hypertension that causes the vomiting, then the prognosis is poor. If a digestive problem is the cause of the disease, the prognosis depends on many factors and is therefore variable.

BAM V 482 ii 11 [If a person, (the venous cordage/a vein) in his temple] grips him with pain (*şabissuma*) so that it devours him with pain (*ikkalšu*) and he vomits (*i'arru*) [...]

Sa-gig tablet 4: 11 If (the venous cordage/a vein) in his temple grips him with pain (*işbissuma*) so that ditto (he keeps shouting: ‘my belly, my belly’), he vomits profusely and does not rise from bed.

Sa-gig tablet 4: 76 If the venous cordage/a vein in his temple grips him with pain (*işbissuma*), and moreover he vomits blood: Hand of a Ghost.

Sa-gig tablet 4: 77 If the venous cordage/a vein in his temple keeps gripping him with pain (*işanabissuma*), and moreover he vomits blood, he cannot digest/tolerate bread or beer: Hand of a Ghost.

Given the signs recorded by the practitioner, including loss of appetite or food intolerance, it is possible that he associated the vomiting with problems of the digestive system and not with the headache (or a “grip” of the head). It raises the question of whether the vomiting associated with the headache in BAM V 482 was in fact of the same order for the physician (note that BAM V 482 ii 14, although incomplete, indicates that an appetite problem is also present, suggesting a digestive pathology). It can indicate that the pain did not have the characteristics of a migraine. Alternatively, more likely, the physician (and his patient) had not identified these particularities and did not look for them.

### 8.6.2 Duration of the pain could give indications.

The description of the occurrence of pain lasting from morning to evening or from evening to morning is highly suggestive of a painful pathology. See the comments given by JoAnn Scurlock (2005, 78) on the relevance of this observation: “he (*āšipu*) was careful to distinguish treatable headaches that lasted ‘from sunrise to sunset’ from potentially fatal headaches that lasted ‘from sunset to the morning’.” Her point is correct, and indeed we read that the patient would die if the pain persisted or occurred during the night and that he was “just” sick from the Ghost Hand when the pain only occurred during the day. It is known that migraines and “tension” headaches have (usually) the property of ceasing during the night and that secondary headaches (neurological or otherwise) are not calmed by sleep. If one searches for benign etiologies of nocturnal headaches, it is possible to find them (e.g., sinusitis or migraine! Not to mention that some people with a visual defect may complain of headaches at the end of the day.)

These descriptions are found in *Sakikkû* and in the second and third tablets of UGU – CRANIUM (following the nomenclature of the Aššur Medical Catalogue).<sup>123</sup> This mention of the duration of the pain or other symptom is rare in medical texts. Apart from headaches it is found in the tablet Sa-gig 13: 127’ for unbearable stomach pains: “if from sunset onwards there is an increase (of the disease) and he keeps screaming: ‘My bowels, my bowels,’ Hand of the Ghost.”<sup>124</sup>

Sa-gig tablet 4: 13 If his temple grips him with pain (*šabtassuma*) and (it) lasts from sunset (<sup>d</sup>utu.šú.a *ereb šamši*) till early morning (en.nun.ud.zal.e *šât urri*) : (alternatively) he spends the night awake, he will die.

Sa-gig tablet 4: 14 If his temple grips him with pain (*šabtassuma*) and from sunrise (<sup>d</sup>utu.è *šît šamši*) to sunset (<sup>d</sup>utu.šú.a *ereb šamši*) it hurts him in an all-consuming way (*ikkalšu*) : (alternatively): he finds no rest, Hand of a Ghost.

In these descriptions, the suffering corresponding to the seizing or gripping of the temple is a persistent ache. It is possible that the verb *dab* = *šabātu* conveys the idea that the suffering has caught hold of the patient. Interestingly, in the second case, the redactor has specified the type of pain, with the verb *gu<sub>7</sub>* = *akálu*. It is unlikely that the term is just “he is in hurt” but he has a pain “that destroys him, devours him.”

BAM V 482 iii 7-9 If a man has a temple causing him seizing pain (*sag.ki dab-su-ma šabtassuma*) and from sunrise (<sup>d</sup>utu.è *šît šamši*) to sunset (<sup>d</sup>utu.šú.a *ereb šamši*) it hurts him in an all-consuming way (*gu<sub>7</sub>-šú ikkalšu*): Hand of Ghost, the exorcist should act according to what he knows. You anoint him with marrow from a [sheep’s?] fibula (and) [ ... ]. You dry, crush (and) sieve *maštakal*-plant, stir it into a mash in the sap of *kasû*-tamarind, [(and) you sprinkle parched<sup>?</sup> grain<sup>?</sup> flour on (the mixture)]. You shave (his head, and) you bandage him with it.

<sup>123</sup> Panayotov S. 2018, 89-120; Steinert U. 2018, 203-291.

<sup>124</sup> For the line numeration and the transcription see Eric Schmidtchen 2021, 526. The translation follows roughly JoAnn Scurlock 2014, 116.

BAM V 482 iv 46'-49': If a man [has the headache-sag.ki.dab.ba], and it hurts him in an all-consuming way (*gu<sub>7</sub>-šú*), (and this pain) lasts<sup>125</sup> from sunset (<sup>d</sup>utu.è *šît šamši*) until the morning watch (*en.nun.ud.zal.li šât urri*), he will die.

These are tricky cases to deal with. The temple-seizure-headache causes pain by gripping and taking hold of the patient. It seems to be equivalent of the temple that takes hold of the patient and hurts. It seems that sag.ki.dab.ba-headache has “two hats,” on the one hand, it is the name of the headache disease, and on the other hand, because of this disease or suffering, its manifestation is a violent pain “destroying or devouring” the head.

AMT 14/5 ii 11-15 // BAM V 493+ i 64'-ii 4 [If] both [of a man's] temples (*killâlan nakkapâtu*) hurt him in an all-consuming way (*gu<sub>7</sub><sup>II</sup>-šú ikallâšu*) from sunrise (<sup>d</sup>utu.è *šît šamši*) to sunset (<sup>d</sup>utu.šú.a *ereb šamši*), his cranium *ugu-šú elišu* causes him a stinging<sup>?</sup> *u[zaqqassu]* pain, his face constantly spins (*panûšu iššanandû*), his neck sinews hurt him in an all-consuming way (*gu<sub>7</sub><sup>II</sup>-šú ikallâšu*), his eyes keep staring, motionless (*ittan[azzazza]*), he keeps forgetting [his words?] (and) his ears roar (*išassâ*); [like ...] ... [...] from his head down to his feet [... as if (it was) bath water ...] he constantly sees dead people, [he has many dreams, (but then) he cannot remember (lit. hold) them: he has been seized in the abandoned steppe by the hand of his family ghost who was killed with a weapon.<sup>126</sup>

This case develops how bilateral devouring pain in the temples destroys the patient through pain and other manifestations. The passage is damaged and not everything can be deciphered, but it seems that this can drive the patient mad or at least alter his mind.

**8.8.** Particularly expressive pain is identified by the doctor when the patient moans or shouts in pain. The following example is challenging: the context is such a violent headache that the patient screams of pain, two other signs are added: the vein protuberance or a painful sensation on the course of the temporal veins and a feeling difficult to define on the top of the head, *eli qaqqadišu paṭir*, “the top of the head is loose or split”.

BAM V 482 iv 49' // AMT 20/1 iv 32'-33': If someone has a sag.ki.dab.ba-headache and consequently / to the extent that he cries out a lot, (and) the cords of his temples are giving an intense surge of pain (*magal tebû*), [(while) the top of his head is flaccid (split<sup>?</sup> dismantled<sup>?</sup>) (*paṭir*)].

Sa-gig tablet 4: 9 if his temple has gripped him *šabtassuma*, and consequently / to the extent that ki.min (he cries out a lot *ištanassî*), (and) the cords of his temples are much protruded (*magal tebû*), (while) the top of his head is flaccid (split<sup>?</sup> dismantled<sup>?</sup>) (*paṭir*)

Sa-gig tablet 4: 10 if his temple has gripped him, and consequently / to the extent that he cries out a lot, (and) the cords of his temples are protruding, (while) the top of his head is stiff.

<sup>125</sup> The translation follows Sa-gig tablet 4: 3 entry. The interpretation in NinMed presenting *urruk* as “it will be prolonged, he will die,” suggesting that the illness will be long and finish with death, does not convince me. I stick to our interpretation (Attia A., Buisson G. 2003) in JMC 1: 15 “si sa *douleur* dure du coucher du soleil à la veille de l'aube, il mourra.”

<sup>126</sup> For AMT 13/5+ see transcription and translation at: <http://oracc.org/asbp/ninmed/P394756> accessed 02/11/2022, for BAM V 493+ <http://oracc.org/asbp/ninmed/P394480> accessed 02/11/2022.

Without a notion of trauma, the translation of *paṭir* by split is not acceptable. If the patient is not a baby, neither is the translation dismantled (the fontanelles are fused in adults). As the two sensations seem to oppose each other, the concept that the top of the head is flaccid (soft like the brain) can be contrasted with a feeling of tension in the veins. In Sa-gig tablet 4: 10, instead of /duh/ the scribes used *habiš*, to be stiff or swollen, which is the opposite of soft, flaccid.

The interpretation of *zi = tebû*, is delicate. If one believes that the therapeutic compendium is the primary text, one must choose the suffering of the cords of the temple, and if it is the diagnostic treatise, then it is the aspect of the vein that is described. Unfortunately, the modern physician cannot help: both can be observed, with different possible interpretations.

### 9. Another question remains unsolved:

Sylvia Salin wrote articles about pain that strikes (more or less strongly),<sup>127</sup> that pierces and stings,<sup>128</sup> namely *tag lapātu*, *šig mahāšu*, for striking and *gir.gir zaqātu (zuqqutu)*, *sahālu* for piercing pain. Intriguingly and unexpectedly, these types of pain are not documented in the Mesopotamian medical texts for the temple *šer'ānu*. Moreover there are very few attestations of these verbs for “sag.ki” headaches. Quotes are rare like: AMT 54/2 tr 2'. *diš na murub<sub>4</sub> ugu-šú u sag.ki<sup>meš</sup>-šú tag.tag-šú* “if a person, the middle of their skull and temples do hit him painfully permanently.” And yet this type of pain exists, or at least this type of pain description is part of the patients’ complaints (nowadays). The vocabulary of pain, although it is the patient’s domain, is in fact stereotyped. We have seen that a civil servant in Mari uses terms peculiar to him that did not make their way into the “technical” medical vocabulary. Similarly, certain types of pain belong to certain parts of the body and not to others. Furthermore, the technical vocabulary does not overlap depending on the “editorial” context, be it diagnostic or therapeutic.

### 10. Conclusion

This long “promenade” began with the anatomical structure called *šer'ānu*, a solid and flexible structure in the shape of a cord. It led us to distinguish the different avatars of this word which varied according to the use made of it by the categories of professionals. It brought us to the pulse problem, considering that health professionals (in particular) named tendons, nerves and blood vessels in this way. This *šer'ānu* had a prevalent place in the symptomatology, and different deviations from their usual aspect or function were described. It was legitimate to ask whether the doctors had identified and measured the pulse. For the author of this article, while the ancients knew about the beating of the heart and arteries, they did not recognise the pathological nature and implications of changes in heart rhythm. They had been struck by the unusual visibility of these “cords” when protruding and had described this anomaly “from head to toe”. They associated *šer'ānu* with pain, particularly in the head. Several verbs were used to describe this pain, but it was impossible for the author to characterise it explicitly in this article. The undifferentiated use of these different verbs for each other in similar contexts was the main obstacle to this identification. Another obstacle was that each sign or symptom was isolated and did not allow visualising the clinical picture.

<sup>127</sup> Salin S., 2015, 310-336.

<sup>128</sup> Salin S., 2017, 35-48.

The tedious enumeration of the various diseases that could correspond to the clinical pictures was intended to show how complex a retrospective diagnosis is for a doctor who does not have sufficient information in the texts left by the Assyro-Babylonian physicians. This study did not make it possible to clearly define the characteristics that would have made it possible to identify the various cephalalgia, such as migraine or tension headache, to quote only the most common ones. However, it made it possible to understand how certain verbs were chosen according to whether they belonged to the medical diagnostic handbook or therapeutic texts. Different hypotheses concerning the translation of pain verbs were provided, with the hope that they were not too far-fetched.

### Abbreviations

<b>AbB</b>	Altbabylonische Briefe in Umschrift und Übersetzung AbB 9, cf. Stol Marten 1981. URL: <a href="https://www.archibab.fr/B637">https://www.archibab.fr/B637</a> .
<b>ABL</b>	<i>Assyrian and Babylonian Letters</i> ABL 455, cf. Harper Robert 1900; ABL 571, cf. Harper Robert 1902.
<b>AHw</b>	Wolfram von Soden 1965-1981. <i>Akkadisches Handwörterbuch</i> , 3 volumes, Wiesbaden: Otto Harrassowitz.
<b>Alamdimmu</b>	<i>Šumma alamdimmû</i> , Physiognomic Omen Serie cf. Böck Barbara 2000, 71-127.
<b>AMD</b>	Ancient Magic and Divination
<b>AMT</b>	Assyrian Medical Texts, cf. Campbell Thompson Reginald 1923.
<b>Antagal</b>	lexical series an-ta-gál = <i>šaquû</i> , cf. MSL 17, 131ff.
<b>AO</b>	tablet siglum in the Museum Louvre (Antiquités orientales).
<b>ARCHIBAB</b>	Archives Babyloniennes (XX <sup>e</sup> - XVII <sup>e</sup> siècles av. J.-C.) URL: <a href="http://www.archibab.fr/Accueil.htm">http://www.archibab.fr/Accueil.htm</a>
<b>ARM</b>	Archives Royales de Mari ARM 3, cf. Kupper Jean-Robert 1950, URL: <a href="https://www.archibab.fr/B380">https://www.archibab.fr/B380</a> . ARM 13 42, cf. Bottéro Jean 1964, URL: <a href="https://www.archibab.fr/B5038">https://www.archibab.fr/B5038</a> . ARM 13 56, cf. Birot Maurice 1964, URL: <a href="https://www.archibab.fr/B5040">https://www.archibab.fr/B5040</a> . ARM 13 124, cf. Kupper Jean-Robert 1964, URL: <a href="https://www.archibab.fr/B5045">https://www.archibab.fr/B5045</a> . ARM 23, cf. Joannès Francis 1984, URL: <a href="https://www.archibab.fr/B5060">https://www.archibab.fr/B5060</a> . ARM 26/1, cf. Durand Jean-Marie 1988, URL: <a href="https://www.archibab.fr/B276">https://www.archibab.fr/B276</a> .
<b>ARMEP</b>	Ancient Record of Middle Eastern Politics URL: <a href="http://oracc.museum.upenn.edu/armep/">http://oracc.museum.upenn.edu/armep/</a>
<b>BABMED</b>	Babylonische Medizin, URL : <a href="https://www.geschkult.fu-berlin.de/e/babmed">https://www.geschkult.fu-berlin.de/e/babmed</a> .
<b>BAM</b>	Die babylonisch-assyrische Medizin in Texten und Untersuchungen BAM I, cf. Köcher Franz 1963a; BAM II, cf. Köcher Franz 1963b; BAM IV, cf. Köcher Franz 1971; BAM V, cf. Köcher Franz 1980a; BAM VI, cf. Köcher Franz 1980b. BAM VII, cf. Geller Markham 2005; BAM 8, cf. Geller Markham 2016; BAM 9, cf. Steinert Ulrike 2018; BAM 10, cf. Geller Markham, Panayotov Strahil 2020; BAM 13, cf. Schmidtchen Eric 2021.
<b>BM</b>	tablet siglum in the collection of the British Museum
<b>BRM</b>	Babylonian Records in the Library of J. Pierpont Morgan BRM 4, cf. Clay Albert T. 1923.

<b>CAD</b>	<i>The Assyrian Dictionary of the Oriental Institute of the University of Chicago</i> , 21 volumes (1956-2010), Chicago: Oriental Institute.
<b>CBS</b>	tablet siglum in the University Museum in Philadelphia (Catalogue of the Babylonian Section)
<b>CCP</b>	Cuneiform Commentaries Project on ORACC URL: <a href="https://ccp.yale.edu">https://ccp.yale.edu</a> .
<b>CDLI</b>	Cuneiform Digital Library Initiative URL: <a href="https://cdli.ucla.edu">https://cdli.ucla.edu</a> .
<b>Comm.</b>	commentary
<b>CRANIUM</b>	Medical treatise in the Nineveh Medical Compendium focusing on head ailments and diseases, title proposed in Steinert Ulrike 2018.
<b>CT</b>	Cuneiform Texts from Babylonian Tablets in the British Museum CT 11, cf. Campbell Thompson Reginald 1900; CT 21, cf. King Leonard 1905; CT 23, cf. Campbell Thompson Reginald 1906; CT 31, cf. Handcock Percy 1911; CT 35, cf. Leeper Alexander, Gadd Cyril 1920.
<b>CUSAS</b>	Cornell University Studies in Assyriology and Sumerology CUSAS 10, cf. George Andrew 2009; CUSAS 18, cf. George Andrew 2013.
<b>DCCLT</b>	Digital Corpus of Cuneiform Lexical Texts URL: <a href="http://oracc.museum.upenn.edu/dcclt/">http://oracc.museum.upenn.edu/dcclt/</a> .
<b>DOI</b>	digital object identifier
<b>Ea</b>	lexical series <i>Ea A = nâqu</i> , cf. MSL 14.
<b>FM</b>	Florilegium marianum FM 16, cf. Reculeau Hervé 2018.
<b>GCCI</b>	Goucher College Cuneiform Inscriptions GCCI 2, cf. Dougherty Raymond 1933.
<b>Gilg.</b>	Epic of Gilgamesh
<b>HSM</b>	tablet siglum in the Harvard Semitic Museum
<b>Idu</b>	á = <i>idu</i> , a brief two-tablet sign list of the first millennium Idu II, cf. CT 11 29-32.
<b>IGI</b>	Medical treatise focusing on eyes ailments and diseases, cf. BAM 10.
<b>Izi</b>	lexical series <i>izi = išātu</i> , cf. MSL 13, 154ff.
<b>JMC</b>	Le Journal des Médecines Cunéiformes
<b>K</b>	tablet in the Koujunjik collection of the British Museum
<b>KAR</b>	Keilschrifttexte aus Assur Religiösen Inhalts KAR 152, cf. Ebeling Erich 1919.
<b>KUB</b>	Keilschrifturkunden aus Boghazköi KUB 37, cf. Köcher Franz 1953.
<b>LKA</b>	Literarische Keilschrifttexte aus Assur, cf. Ebeling Erich 1953.
<b>MAOG</b>	Mitteilungen der Altorientalischen Gesellschaft MAOG 11/1-2, cf. Meissner Bruno 1937.
<b>Maqlû</b>	cf. Abusch Tzvi 2016 URL: <a href="http://oracc.museum.upenn.edu/cmawro/maqlu/">http://oracc.museum.upenn.edu/cmawro/maqlu/</a>
<b>MB</b>	Middle Babylonian
<b>MSL</b>	Materialien zum sumerischen Lexikon / Materials for the Sumerian Lexicon MSL 9 95, cf. Kilmer Anne D., Landsberger Benno 1967; MSL 13, cf. Civil Miguel <i>et al.</i> 1971; MSL 14, cf. Civil Miguel, Green Margaret, Lambert Wilfred

- 1979; MSL 17, cf. Cavigneaux Antoine, Güterbock Hans G., Roth Martha T. 1985.  
**muššu'u** cf. Böck Barbara 2007.  
**Nigga** lexical series níg-GA = *makkuru*, cf. MSL 13, 91ff.  
**NinMed** The Niniveh Medical Encyclopedia.  
 BAM 480 URL: <http://oracc.org/asbp/ninmed/P365742>  
 BAM 482 URL: <http://oracc.org/asbp/ninmed/P365744>.  
 BAM 493 URL: <http://oracc.org/asbp/ninmed/P394480>.  
 AMT 19/1+ URL: <http://oracc.org/asbp/ninmed/P396343>.  
 AMT 13/5+ URL: <http://oracc.org/asbp/ninmed/P394756>.  
**OB** Old Babylonian  
**ORACC** the Open Richly Annotated Cuneiform Corpus  
 URL: <http://oracc.museum.upenn.edu/>  
**SAA** State Archives of Assyria (Helsinki: The Neo-Assyrian Text Corpus Project)  
 URL: <http://oracc.museum.upenn.edu/saa/>  
 SAA 10, cf. Parpola Simo 1993; SAA 12, cf. Kataja Laura, Whiting Robert 1995;  
 SAA 15, cf. Fuchs Andreas, Parpola Simo 2001; SAA 19, cf. Luukko Mikko 2012;  
 SAA 20, cf. Parpola Simo 2017.  
**Sa-gig** The diagnostic omen series *Sakikkû*, Diagnostic Handbook, Mesopotamian title of  
 the medical series devoted to diagnosis and prognosis, cf. Labat René 1951, Heeßel  
 Nils 2000, Scurlock JoAnn 2014 (pp. 13-292), Schmidtchen Eric 2021.  
**SB** Standard Babylonian  
**SEAL** Sources of Early Akkadian Literature  
 URL: <http://www.seal.uni-leipzig.de>  
**Sefaria** A Living Library of Thora Texts Online  
 URL: <https://www.sefaria.org/texts>  
**SpTU** Spätbabylonische Texte aus Uruk  
 SpTU 1, cf. Hunger Hermann 1976; SpTU 4, cf. Weiher Egbert 1993.  
**STT** The Sultantepe Tablets, STT I, cf. Gurney Oliver, Finkelstein Jacob 1957.  
**šà.zi.ga** “arousal”, relating to incantations and rituals to stimulate sexual desire, cf. Biggs  
 Roberts 1967.  
**TBP** *Texte zur babylonischen Physiognomatik*, cf. Kraus Fritz 1939.  
**TDP** *Traité akkadien de diagnostics et pronostics médicaux* (Diagnostic Handbook), cf.  
 Labat René 1951.  
**Udug-hul** Incantation series, cf. Geller Markham 2016, BAM 8.  
**UGU** Medical treatise CRANIUM  
**Ura** First millennium thematic lexical list  
 URL: <http://oracc.museum.upenn.edu/dcclt/lexicallistsperiods/neobabylonian/>  
**URL** Uniform Resource Locator (‘web address’).  
**WL** Water for Larsa, cf. Walters Stanley 1970.  
**YNER** Yale Near Eastern Researches  
 YNER 4, cf. Walters Stanley 1970.  
**YOS** Yale Oriental Series, Babylonian Texts  
 YOS 10, cf. Goetze Albrecht 1947;  
 YOS 11, cf. van Dijk Jan, Goetze Albrecht, Hussey Mary I. 1985.



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