THE MISWĀK, AN ASPECT OF DENTAL CARE IN ISLAM

by

GERRIT BOS *

Gustav Nachtigal, the famous nineteenth-century traveller and explorer of the Sahara and Sudan, relates that the women of Wadāī, a region in the Sudan, rarely go out without their toothbrushes in the corner of their mouths. These toothbrushes are, as he says, prepared from the wood of the siwāk (Salvadora persica L.), which has been made fibrous at the end, and as soon as they sit down they use these brushes diligently. Reporting in an article in 1915 the information of Dr Meyerhof, an ophthalmologist who had practised for many years in Cairo, Wiedemann declares that the Nubians always carry with them a wooden stick of about 15 to 20 cm, called siwāk, to which they probably owe their shiny white teeth. Von Luschan, a privy councillor from Berlin, informed him that this kind of wooden stick could be found not only among the Nubians, but throughout Africa, even among the most southern Bantu tribes. He also told him that there still were, or had been until recently, thousands of caravan-carriers who took nothing else with them but a gourd for water and a “msuaki” (= miswāk). Even nowadays pious Muslims belonging to the religious movement called Jamā′at al-taḥwithstanding can often be seen wearing the siwāk in their breast pockets, which they use on every suitable occasion.

In this way, all these Muslims follow the example of their Prophet who according to the Ḥadīth, was a fervent supporter of its use. The siwāk was, according to him, a

* Gerrit Bos, Ph.D., Research Fellow at the Wellcome Institute for the History of Medicine, 183 Euston Road, London NW1 2BE.

Some points in this article have also been discussed in Vardit Rispler-Chaim’s ‘The siwāk: a medieval Islamic contribution to dental care’, J. Royal Asiatic Soc., third series, vol. 2, Part I, April 1992, pp. 13–20.

1 G. Nachtigal, Sahara und Sudan, 3 vols, Leipzig, 1889, repr. Graz, Akademische Verlagsanstalt, 1967, vol. 3, p. 261.
2 Eilhard Wiedemann, ‘Zahnärztliches bei den Muslimen’, Aufsätze zur arabischen Wissenschaftsgeschichte, 1970, 2: 181–3, p. 181.
3 Eilhard Wiedemann, ‘Über Zahnpflege bei den muslimischen Völkern’, Gesammelte Schriften zur Arabisch-Islamischen Wissenschaftsgeschichte, 1984, 2: 873–8, p. 874. Wiedemann originally published this article in 1918. Von Luschan recommended him not to translate miswāk as “Zahnbürste” but as “Zahnpinsel”.
4 On this religious movement founded in India in the middle of the nineteenth century see Anwarul Haq, The faith movement of Maulānā Muḥammad Iyās, London, Allen and Unwin, 1972. I thank my friend Yasien Mohammad for this information.
5 For a survey and source references see A. J. Wensinck, A handbook of early Mohammedan tradition alphabetically arranged, Leiden, E. J. Brill, 1927, p. 230, s.v. toothbrush. Idem, an article on the miswāk in The encyclopaedia of Islam, new edition, Leiden and London, E. J. Brill, 1960 (hereafter Encyclopaedia), vol.
The miswāk, an aspect of dental care in Islam

purgative for the mouth and a pleasure for Allāh. When the Prophet came into his house he first of all used the siwāk. When he woke during the night, he cleansed his mouth with it, then washed himself and prayed. And the only reason he did not declare its use obligatory for the community before every ṣalāt (ritual prayer) was that he feared to burden his followers. His servant ‘Abd Allāh b. Mas‘ūd was called ṣaḥīb al-siwāk since he was the one who took care of the Prophet’s siwāk. When the Prophet was on his deathbed he cleansed his mouth with the siwāk, after Aisha had chewed it so that it became smooth and soft. The extent to which the use of the siwāk, in the Muslim mind, is associated with the Prophet, may be illustrated by the fact that the tree from which the siwāk was prepared was called siwāk al-Nabi or “siwāk of the Prophet” in Algeria. In spite of the Prophet’s example and the importance he attached to the use of the siwāk, Muslim law (Fiqh) did not make its use obligatory, but only desirable at all times.

The kind of wood recommended for the preparation of the toothbrush called siwāk or miswāk is that of the arāk tree. Abū Ḥanīfa al-Dinawārī, for instance, the ninth-century pharmacologist, states that this tree is best-known for the preparation

---

7, p. 187. It should be noted that these ḥadīths do not prove that the Prophet actually used the miswāk. It is perfectly possible that they merely try to give authenticity to a later practice by attributing it to the Prophet. For our purpose, however, it is important to realize that these ḥadīths are reflections of a practice current amongst the Muslims, and that these stories, once in vogue, probably strengthened the existing practice by using the Prophet as the model to be imitated. I thank Dr Lawrence Conrad for his valuable remarks on the interpretation of the different ḥadīths cited.

6. Muslim, Ṭahāra, trad. 43.
7. al-Bukhārī, Adhān, bāb 8.
8. al-Bukhārī, Jum‘a, bāb 8.
9. al-Bukhārī, Faḍā‘il al-Ṣaḥāba, bāb 20.
10. al-Bukhārī, Mağhāzī, bāb 83.
11. Wiedemann, op. cit., note 2 above, p. 182.
12. See Wensinck’s article on the miswāk, op. cit., note 5 above, for a detailed discussion about the use of the miswāk according to Muslim law.
13. Neither term occurs in the Qur’an, and in Ḥadīth only siwāk is used. In medical literature both occur. As the citation from Nachtigal shows, the term siwāk is used for the toothbrush as well as for the tree from which it is made, which is also called arāk; cf. R. Dozy, Supplément aux dictionnaires Arabes, 2nd ed., 2 vols, Leiden and Paris, Brill-Maisonneuve, 1927, vol. 1, p. 707, siwāk: “est l’arbre qui porte aussi le nom de arāk”; see also note 14 below. Moreover the term siwāk is used for the act of brushing the teeth as the citations from al-Majūsi will show; cf. Wensinck’s article on the miswāk, op. cit., note 5 above.
14. “Der arāk-Baum, eine Charakter-Pflanze der subtropischen Steppengebiete, ist Salvadoras persica L., Zahnbürstenbaum oder (im NT) Senfbaum, Salvadoraceae. Sein zähfaseriges Zweigholz ist pinselartig ausgefranst und als Zahnbürste (siwāk) verwendbar und geschätzt”, cf. Albert Dietrich (ed.), Dioscurides triumphans. Ein anonymer arabischer Kommentar (Ende 12. Jahrh. n. Chr.) zur Materia medica, 5 books in 2 vols, Göttingen, Vandenhoeck & Ruprecht, 1988, bk 3, no. 16. For other properties ascribed to this tree see D. Denham, Capt. Clapperton and Dr Oudney, Voyages et découvertes dans le Nord et dans les parties centrales de l’Afrique, 3 vols, Paris, 1926, vol. 1, pp. 162–3: souag: “arbre de la tétardrie dont les baies rouges sont presque aussi bonnes que celles de la canneberge. La baie ou la drupe de cette arbre est très recherchée dans le Borno et le Soudan, parce qu’on lui attribue la vertu de faire cesser la stérilité. Il est douceâtre et chaud au goût, à peu près comme le cresson de fontaine. En passant près de cette plante, on est toujours frappé d’une odeur forte et narcotique.” See also Manfred Ullmann, Zum Verständnis der “Dichterischen Vergleiche der Andalus-Arabier”, Welt des Orients, 1977, 9: 108. In a scientific experiment carried out recently, English and Saudi researchers have shown that the wood of the arāk tree prevents plaque and inflammation of the gums. This wholesome effect can be explained, they suggest, by the occurrence of certain chemicals in it, such as fluoride, tannins, and a resinous substance (see M. J. Gazi et al., “The immediate- and medium-term effects of Meswak on the composition of mixed saliva”, J. Clin. Periodontol., 1992, 19: 113–17).
of the *miswāk* from its roots, branches and *ṣuru*.¹⁵ Nachtgal¹⁶ informs us that this kind of wood has the quality of making the breath of the women of Wadāʾi sweet-smelling. Wiedemann¹⁷ states that the toothbrush used in Egypt is exclusively prepared from this wood. In addition to the *arāk* tree, al-Dinawarī refers to other kinds of trees, the wood of which is good for the *miswāk*, namely, balsam of Mecca,¹⁸ *işīl*,¹⁹ turpentine tree,²⁰ *nuʿd*,²¹ *shathh*,²² *yastaʿūr*,²³ roots of *ʿarfaj*,²⁴ *dārim*,²⁵ fruitstalks (*ʿarāfīn*) of the palm-tree, small or young palm-trees (*alaj*), and leaves of the *ruḥmā*.²⁶ *Al-Washshā*,²⁷ (d. 936) author of the *K. al-muwashshā*, a handbook for good manners and etiquette (*Adab*), mentions, besides the *arāk* tree, sugar-cane,²⁸ roots of liquorice,²⁹ wood of *Prunus mahaleb* L.,³⁰ roots of lemon-grass,³¹ and the nodes of

¹⁵ Abū Ḥanīfa Aḥmad b. Dāwūd al-Dinawarī, *K. al-nabāt* (Alif-Zay), ed. Bernhard Lewin, Wiesbaden, Franz Steiner Verlag, 1974, p. 225. For the term *ṣuru* cf. E. W. Lane, *An Arabic-English lexicon*, 8 vols, London, Williams and Morgan, 1863–1879, vol. 4, p. 1679, s.v. *ṣar*: “A twig, or rod, drooping, or hanging down, to the ground, falling upon it, but with its base upon the tree, so that it remains falling in the shade, the sun not reaching it, and therefore becomes more soft, or supple, than the branch [from which it hangs], and more sweet in odour; and it is used for rubbing and cleaning the teeth.”

¹⁶ Nachtgal, op. cit., note 1 above, p. 261.

¹⁷ Wiedemann, op. cit., note 2 above, p. 181.

¹⁸ *bīshām*, cf. A. Issa, *Dictionnaire des noms de plantes en latin, français, anglais et arabe*, Cairo, Imprimerie Nationale, 1930, p. 55. no. 7: “Commiphora opobalsamum; balm of Gilead; balsam of Mecca.”

¹⁹ *işīl*, cf. al-Bīrūnī, *Book on pharmacy and materia medica*, edited with English translation by Hakim Mohammed Said, Karachi 1973, p. 25. no. 49: “It is a tree, the shoots of which are used as *miswāk*”; and p. 60. no. 141: “Salvadora oleoides Done. (family, Salvadoraceae)”.

²⁰ *dirw*, cf. Dietrich, op. cit., note 14 above, bk 1, no. 34: “Dirw is der arabische Name für Pistacia lentiscus [Moench], Mastixstrauch, Anacardiaceae. Sie ist die Stammfläche für das zur Gruppe der Kauharze (ʿulāk) gehörende Mastixharz, das früher zur Festigung des Zahnfleisches, gegen Magenbeschwerden u.a. Verwendung fand.”

²¹ *nuʿd*, cf. A. de Biberstein Kazimirski, *Dictionnaire arabe-français contenant toutes les racines de la langue arabe*, nouvelle édition, 2 vols, Paris, G.-P. Maisonneuve, 1960, vol. 2, p. 1295: “Sorte d’arbre à épines fréquent dans le Hedjaz, dont l’écorce est employé pour tanner les cuirs, et du bois duquel on fait des cure-dents.” (derived from G. W. Freytag, *Lexicon Ararico-Latinum*, 4 vols, Halle 1830–37, vol. 4, p. 802).

²² *shathth*; cf. Freytag, op. cit., note 21 above, vol. 2, p. 393: “Nomen herbæe odoratae et amarae, qua corium praeparatur.” See also E. W. Lane, op. cit., note 15 above, vol. 1, p. 1504.

²³ *yastaʿūr*, cf. de Biberstein Kazimirski, op. cit., note 21 above, vol. 2, p. 1627: “Sorte d’arbre dont on fait d’excellents cure-dents”.

²⁴ *ʿarfaj*, cf. Dozy, op. cit., note 13 above, vol. 2, p. 118: “branche-ursine ou acanthe”; Lane, op. cit., note 15 above, vol. 5, p. 2017.

²⁵ *dārim*, Freytag, op. cit., note 21 above, vol. 1, p. 26: “Nomen arboris ei, quae ḡadhā appellatur, similis”.

²⁶ al-Dinawarī, op. cit., note 15 above, pp. 225–30. For *ruḥmā* see Isa, op. cit., note 18 above, p. 56, no. 17: “Convolvulus lanatus (Convolvulaceae)”.

²⁷ Abū Ṭayyib Muhammad b. Ḫalīl b. Yaḥyā al-Washshā, *K. al-Muwashshā*, ed. R. E. Brünnow, Leiden, E. J. Brill, 1886, p. 141; transl. D. Bellmann, *Das Buch des buntestickten Kleides*, 3 vols, Leipzig and Weimar, Gustav Kiepenheuer Verlag, 1984, vol. 2, p. 101. On the author see vol. 3 of Bellmann’s translation, pp. 5–21.

²⁸ *al-sukkar*, is here *qaṣab* al-sukkar or sugar cane. The term *sukkar* refers to many different forms of sugar; cf. Dietrich, op. cit., note 14 above, bk. 2 no. 65 and Encyclopaedia, op. cit., note 5 above, vol. 4, pp. 682–4, s.v. *qaṣab* al-sukkar (article by M. Canard and P. Berthier).

²⁹ *ṣūs*, cf. Dietrich, op. cit., note 14 above, bk. 3, no. 5: “Glycyrrhiza glabra L. und Var., Süßholz, Leguminosae.”

³⁰ *mahlab*, cf. Dietrich, op. cit., note 14 above, bk. 1, no. 65, n. 4: “Prunus mahaleb seu Cerasus L. und Var., Felsenkirsche, Weichselkirsche, Steinweichsel, Rosaceae.”

³¹ *idkhhr*, Dietrich, op. cit., note 14 above, bk. 1, no. 14: “Die Pflanze ist das Cymbopogon schoenanthus [L.] Sprengel, Bartgras, früher auch Kamelheu, Juncus odoratus genannt, Gramineae.”
The miswāk, an aspect of dental care in Islam

pyrethrum. 32 Al-Washshā' 33 also remarks that the more often one uses these materials the more perfect one's manners are considered to be. Ibn al-Jazzār 34 (tenth century) recommends palm-branches (sa'af) and arāk. Ibn Sīnā 35 (980–1037) and al-Majṣūsī 36 (tenth century) remark that the best kind of wood for a siwāk is that which has astringency (qabd) and bitterness (marāra). Ibn Butlān 37 (eleventh century) recommends the fruit-stalks of the palm-tree, imported from Mecca. 38 The wood is made fit for this purpose by chewing its end so that it becomes smooth and fibrous. Its size varies from 4 cm to 20 cm, and its diameter from 1 to 1.5 cm, from what I have seen personally. According to Wiedemann, 39 its length varies from 15 to 20 cm. The miswāk is not only prepared from the branches or roots of the arāk tree, but also from its bark. 40

The use of the siwāk, however, was not introduced under Islam. It is an old pre-Islamic custom, which was adhered to by the ancient Arabs to get their teeth white and shiny. For white shiny teeth were a symbol of beauty and attractiveness. The white teeth of the beloved are often compared with a string of pearls in ancient pre-Islamic Arabic poetry. 41 Another possible reason for its observance is its contribution to ritual purity. 42 This custom was then, according to the Ḥadīth, adopted and Islamized by the Prophet.

In the early Islamic period proper use of the siwāk became part of a cultivated and elegant mode of life. Al-Washshā' remarks:

Know that it belongs to the etiquette of fine, respectable, well-educated, pious, and proud people to use the siwāk for cleaning the teeth. For this is, according to them, the most noble cleanliness, the best ritual purity and the most perfect respectability. This is

32 'āqiqarḥā, cf. Dietrich, op. cit., note 14 above, bk. 3, no. 69: “Anacylus pyrethrum [L.] Link, Römischer Bertram, Speichelwurz, Compositae”, al-Kindī employs it in a prescription for dentifrices; cf. Martin Levey, The medical formulary or Aqrābādhi of al-Kindi. Translated with a study of its materia medica, Madison, Milwaukee, and London, University of Wisconsin Press, 1966, p. 301, no. 191.

33 Al-Washshā’, op. cit., note 27 above, vol. 2, p. 101.

34 See quotation on p. 77 below.

35 On the author see Manfred Ullmann, Die Medizin im Islam, Leiden and Cologne, E. J. Brill, 1970, pp. 152–6; the quotation is from K. al-Qāmūn fi al-tibb, 5 books in 3 vols, repr. Beirut, n.d., Kitāb III, Fann 7, (p. 184).

36 See citation from his K. al-malāki on p. 78 below.

37 Cf. Ullmann, op. cit., note 35 above, pp. 157–8; Ibn Butlān, Le Taqwīm al-sīḥḥa (Taucini Sanitatis) d'Ibn Butlān: un traité médical du XIe siècle, ed. Hosam Elkhadem, Louvain, Peeters, 1990, pp. 9–13.

38 Taqwīm al-sīḥḥa, pp. 106–7, 215.

39 Op. cit., note 2 above, p. 182.

40 Cf. Helga Venzlaff, Der Marokkanische Drogenhändler und seine Ware, Wiesbaden, Franz Steiner Verlag, 1977, pp. 96–7; she remarks that in Morocco strips of 20 cm long and 1 cm wide which have been rolled up, are sold in the market, and that pieces of about 3 cm long are broken off and their ends chewed.

41 See Charles James Lyall (ed.), The Mufaddaliyyāt. An anthology of ancient Arabian odes compiled by al-Mufaddal son of Muḥammad, Oxford, Clarendon Press, 1921, p. 382, no. 40; cf. Otto Spies, ‘Beiträge zur Geschichte der arabischen Zahnheilkunde’, Sudhoff’s Archiv, 1962, 46: 153–77, pp. 174–5. This article contains important material on Arabic dentistry.

42 Cf. Abū Ja‘far Muḥammad ibn Jarīr al-Ṭabarī, Ta’rīkh al-rusul wa-al-maḥāk [Annales], ed. M. J. de Goeje et al., 3 series, Leiden, E. J. Brill, 1879–1901, series 1, p. 311, 11. 16–20: “Ibn Bashshār told us on the authority of Sulaymān b. Ḥarb who told us on the authority of Abū Ḥilāl who told us on the authority of Qatāda about Allāh’s saying ‘When Ibrāhīm was tried by his Lord with certain words’ (Qur’ān, Sura 2: 124);
the aim of fine and noble people. The siwāk has recognized qualities. Moreover it belongs to the Sunna [custom] of the Prophet.\textsuperscript{43}

He also formulates certain rules for its proper use:

For the cleaning of the teeth with the miswāk definite times [of the day] and places have been prescribed. One should not use it at improper times nor should one go beyond the times fixed for it. One may use it in the morning and evening, during the afternoon, before daybreak and after prayer. It is also permitted to use the miswāk on an empty stomach, before going to sleep and during the daytime when fasting. Fine, well-educated people are not allowed to use the siwāk in certain places as, for instance, in the toilet, in the bath, in the middle of the street, and among many people. None of them cleans his teeth when standing, reclining upon his side, or lying down. Neither does he clean them when everyone is looking at him, or when he is speaking. To use the siwāk on the toilet and in the bath belongs to the bad habits of the low and common people, for such an abuse weakens the gums and worsens the breath of the mouth. Well-educated, respectable and fine people never behave in that way.\textsuperscript{44}

I have quoted this text in its entirety because it not only informs us about the correct way fine and well-educated people (al-zurafā‘ wa-al-udabā‘) should use the siwāk, but also contains unique information about the extravagant use the low and common people (al-sifla wa-al-‘awāmm) made of it in those days. They used it all the time, in all positions and circumstances. They used it even when they were in the toilet, talking to someone, taking a bath, in the middle of the street, or even when at the centre of everyone’s attention. Neither did they care very much if their siwāk was completely used up, nor did they protect it from dirt and dust as may be clear from al-Washshā‘s following statement:

It is a custom of well-educated people not to use the miswāk too long so that the end is worn out. This is, according to them, a despicable habit [of the low, common people]. On the contrary, they prepare for their miswāks wrappers of raw silk or bindings of floss silk to save them from defilement and to protect them from dust and dirt.\textsuperscript{45}

Classical Arab poetry also reflects the use of the siwāk, where it figures as a symbol for the fragrant mouth, the white teeth, the love and beauty of the beloved.\textsuperscript{46} One of the most subtle seems to me the one by Bashshā‘r b. al-Burd (eighth century):

\begin{quote}
that the latter verse means that He tried him with circumcision, the shaving of the pubes, the washing of the anterior and posterior parts, the siwāk, the shaving of the mustache, the cutting of the nails, and the plucking of the hair of the armpit.” Though it is quite probable that the ancient Arabs also used the miswāk for the sake of ritual purity which was so important to them (see J. Wellhausen, \textit{Reste arabischen Heidentums}, 3rd ed. Berlin, Walter de Gruyter & Co., 1961, p. 172), it is impossible to prove this from the hadith cited. For it merely authorizes, as Dr Lawrence Conrad rightly pointed out to me, an Islamic custom by attributing it to the great pre-Islamic figure of Ibrāhīm.
\end{quote}

\textsuperscript{43} al-Washshā‘, op. cit., note 27 above, Brünnnow edition, pp. 140–1; Bellmann translation, vol. 2, p. 100.

\textsuperscript{44} al-Washshā‘, op. cit., note 27 above, Brünnnow edition, pp. 141–2; Bellmann translation, vol. 2, pp. 101–2.

\textsuperscript{45} al-Washshā‘, op. cit., note 27 above, Brünnnow edition, p. 142; Bellmann translation, vol. 2, p. 102.

\textsuperscript{46} For an extensive list of quotations from Islamic poetry see al-Washshā‘, op. cit., note 27 above, Brünnnow edition, pp. 102–5; Bellmann translation, vol. 2, pp. 103–9; see also H. Pérès, \textit{La poésie andalouse en

72
The miswāk, an aspect of dental care in Islam

She cleaned her teeth for me with a miswāk and by this wanted to tell me how pleasant the taste of her mouth was, how she wanted to improve herself. And really! When the miswāk brought to me the spittle of her mouth, cold as ice, like pure water over my hand, then I kissed that which had caressed her mouth and called to it: O would that I could be the miswāk which, my mistress, was so close to you!47

It is interesting to observe that this kind of toothbrush was not used by the Arabs alone, but other people used something akin to it. The Japanese, for example, called it koyoji,48 while the Romans used mastic49 to rub their teeth and as a toothpick.50 Rabbinic literature51 mentions more than once a kind of wooden stick called in Hebrew qeṣam52 and in Aramaic qiṣā,53 which the Jews used for cleaning the teeth. Though this term is usually translated as toothpick, Preuss54 supposes that it is more probably a kind of toothbrush. Though Preuss may be right that sometimes the qeṣam was used in this way, it should be noted that the same term is also used for the small wooden stick with which young girls used to keep the holes in their ears open.55 It is easier to imagine that the size of this stick was that of a toothpick, rather than that of a toothbrush. Moreover, the terminology employed in one source56 refers clearly to the

arabe classique au Xle siècle. 2nd rev. ed, Paris, Adrien-Maisonneuve, 1953, p. 311, for two quotations from Andalusian poets.
47 al-Washshā', op. cit., note 27 above, Brünnow edition, pp. 142–3; Bellmann translation, vol. 2, pp. 103–4.
48 Wiedemann, op. cit., note 3 above, p. 875.
49 Mastic, cf. Dioscurides, De materia medica libri quinque, ed. Max Wellmann, repr. Berlin, Weidmannische Verlagsbuchhandlung, 1958, bk 1, no. 70; translation J. Berendes, repr. Wiesbaden, Dr Martin Sändig, 1970, bk 1, vol. 90, chinos: “Die mastixpistazie... Sie befestigt auch als Mundspülwater lose Zähne. Die grünen Holzspalter, mit welchen statt Zahnstochern die Zähne gereiben werden, machen diese glatt”; cf. note 20 above and Paulys Real-Encyclopädie der classischen Altertumswissenschaft, Neue Bearbeitung unter Mitwirkung zahlreicher Fachgenossen herausgegeben von Georg Wissowa, Stuttgart, 1893, vol. 14, 1930, pp. 2167–75, s.v. “mastic”.
50 Cf. Martialis, Epigrammata, ed. by E. M. Lindsay, 3 vols, Oxford, 1929, vol. 3, p. 82: “stat exoletus suggeritque ructanti pinnas rubentes cuspidesque lentisci”; “There stands a catamite by him and offers his belching throat red feathers, and slips of mastick” (translation by Walter C. A. Ker). See also, C. Daremberg and E. Saglio, Dictionnaire des antiquités grecques et romaines d’après les textes et les monuments, 5 parts in 10 vols, Paris, Librairie Hachette, 1877–1919, s.v. “dentiscalpium”.
51 See Mishnah Beṣa IV, 6; Tos. Shabbat V, 1; T. Jer. Demai 23b.
52 See Alexander Kohut, Sefer Arukh ha-Shalem, Targumie, talmudic and midrashic dictionary of Nathan ben Jechiel, 8 vols, Vienna, 1878–1892, vol. 7, p. 147: “abgehauenes Stück Holz”; Dioscurides, op. cit., note 49 above, bk 1, no. 70; translation Berendes, bk 1, no. 90; Eliezer Ben Yehuda, Millon ha-Lashon ha-Ivrit, Berlin and Tel Aviv, 1910–1959, 17 vols, pp. 6043–4: “chip of wood”.
53 See Jacob Levy, Wörterbuch über die Talmudim und Midraschim, 4 vols., Berlin and Vienna, Verlag Benjamin Harz, 1924, vol. 4, p. 298: “Span, Splitter, Stück Holz”; Michael Sokoloff, A dictionary of Jewish Palestinian Aramaic of the Byzantine period, Ramat-Gan, Bar Ilan University Press, 1990, p. 491: “Tree, pole, wood, chip”.
54 Julius Preuss, Biblisch-talmudische Medizin. Beiträge zur Geschichte der Heilkunde und der Kultur überhaupt, repr. with Introduction by S. Munter; register of Hebrew and Aramaic terms by A. Lowinger, transl. and ed. by S. Paley, New York, Ktav, 1971, p. 331: “Öfters erwähnt wird der qèsam, der Span, schwerlich als Zahnstocher, wahrscheinlich in einer für uns wenig ästhetischen Weise zerbissen als Zahnbüsten, wie es von Muhammed sein Biograph Ibn Hischam berichtet;” cf. register p. lxxvii, s.v. qeṣam: “Splinter, chip = toothpick, brush”;
55 Cf. Mishnah Shabbat VI, 6.
56 Talm. Jer. Demai 23b: “Aýtī li ḥad qīṣ nāhže shinnay”; which means: “Bring me a chip so that I can pick my teeth.”
use of something sharp which one sticks between the teeth. Preuss also refers to a tradition stating that the qesam was carried continuously between the teeth. Another indication that the Jews may have known and used something like the siwāk is the explanation given by Cherbonneau, professor of Arabic in Constantinople, for the term siwāk: “écorce du noyer, avec laquelle les Mauresques et les Juives se frottent les dents et se brunissent les lèvres”. It is perfectly possible that Cherbonneau learned about this custom from the Jews of Constantinople. One of these, Moses Hamon, a sixteenth-century court physician of Sulaymān the Magnificent, was the author of a compendium on dentistry. Although he refers to the miswāk, there are two reasons which make it impossible to conclude that it was used by his compatriots. First because his work is based on Arabic medical literature, and second because he was practising at the Ottoman court. Piamenta, referring to the Jews of Yemen, states in his explanation of the term miswāk that they did not use this utensil.

As well as the siwāk or toothbrush, the Arabs also used the toothpick, which was called k hilāl. Wiedemann refers to information which he got from Dr Schweinfurth, the great traveller and expert on the flora of Egypt, according to which the plant regularly used for a toothpick was nānakhwāh (Ammi visnaga L., Bishops’ weed), which was called by the Egyptians k halla (cf. k hilāl for toothpick). This plant was sold in stands in front of mosques to enable Muslims to clean their teeth before prayer.

From the foregoing it is clear that the use of the siwāk, a pre-Islamic custom, was very common among Arabs throughout history. In the early Islamic period the common people used it so often and in such an ostentatious, unesthetic and unhygienic way that rules were fixed for the cultured and well-mannered prescribing how, when and where to use it, and, even more important, when and where not.

An important question concerning the use of the siwāk and the k hilāl, especially when used so often and sometimes in such an unhygienic way, is how they affected the different parts of the mouth such as teeth, gums and palate from a medical rather than an aesthetic point of view. Al-Washshā remarks:

57 Preuss’s reading of this tradition recorded in Tos. Shabbat V. 1, follows that of M. S. Zuckermandel’s edition (Tosefta, repr. Jerusalem, Wahrman, 1970), which is the same as that of the first edition and of the Erfurt and London MSS. Their version is: “Yoze adam be-qesam she-be-shinnav (we) she-be-sandalo”, which means: “One may go out (on Shabbat) with a chip of wood between the teeth (and) in one’s shoes.” This reading was adopted in later halakhic literature as well. The original version, however, was, as pointed out by Saul Lieberman (Tosefta ki-fshutah, New York, 1962): “Yoze adam be-qesam she-be-she-nez sandalo”, which means: “one may go out (on Shabbat) with a chip of wood between one’s shoes.”

58 M. A. Cherbonneau, ‘Définition lexigraphique de plusieurs mots usités dans le langage de l’Afrique septentrionale’, Journal Asiatique, 1849, 13: 64–70, p. 67.

59 See Arslan Terzioglu (ed.), Moses Hamons Kompendium der Zahnheilkunde, Munich, 1977.

60 Ibid., fol. 52a; cf. Introduction, p. xxviii.

61 Moshe Piamenta, Dictionary of post-classical Yemeni Arabic, 2 vols, Leiden, E. J. Brill, 1990, vol. 1, p. 239.

62 Wiedemann, op. cit., note 2 above, p. 182.

63 See Dietrich, op. cit., note 14 above, bk 3, no. 59; Issa, op. cit., note 18 above, p. 13, no. 2, translates it as pick-tooth.

64 Wiedemann, op. cit., note 3 above, p. 875.

65 It is a pity that the editors of such a prestigious project as The encyclopedia of Islam decided to reprint for the entry on the miswāk Wensinck’s article from the former Enzyklopädie des Islams which deals with it only from the points of view of ḥadith and fiqh while omitting the medical aspect.
The miswāk, an aspect of dental care in Islam

The approaching death did not stop the Prophet—may Allah bless and save him—from requesting a siwāk, for this is verily the most noble object which one can use and approve of. For it whitens the teeth, purifies the mind, is good for the foul breath of the mouth, extinguishes [the fire of] the bile, dries the phlegm,66 strengthens the gums, strengthens the flesh between the teeth,67 makes the sight clear and sharp, puts an end to constipation and stimulates the appetite.68

But at the same time we saw that even al-Washshā had to admit that under certain conditions it can have a detrimental effect on the different parts of the mouth. A more convincing source of information is the clinical experience of those physicians69 who witnessed the harmful effects of the siwāk on the oral health of their patients. It is worth considering their opinion.

Ḥunayn b. Ishāq70 (809–873) wrote a work on dentistry, namely, K. ḥifẓ al-asnān wa-al-litha (On the Preservation of the Teeth and Gums)71 which is still in manuscript. Fragments, however, are cited by al-Rāzī72 (865–925) in his medical compendium K. al-ḥāwī (Liber Continens).73 Quoting Ḥunayn he remarks:

and if someone wants his teeth and gums to stay healthy . . . he should beware of pieces of food left between the teeth, he should clean his teeth painstakingly without unsettling them and without wounding the gums. For an excessive use of the toothpick (idmān al-khilāl) and playing with it wounds the gums; therefore if a person avoids this, his teeth and gums will remain healthy.74

In another statement he declares: “One should not persist in [rubbing] the teeth with the toothbrush (wa-yanbaghī an lā yulaajja ‘alā al-asnān bi-l-siwāk), for this takes away their smoothness, makes them rough and thereby causes them to become rotten75 (ḥafra) and filthy.” To this he adds: “The toothbrush (siwāk) and also warm toothpowders (sanānāt) cause injuries to the soft edge of the gums connected with the

66 Didactic literature also recommends the use of the miswāk because of this quality. For by drying the superfluous phlegm in the brain which is the major cause of forgetfulness, it strengthens the student’s memory; cf. al-Zarrūj, K. Ta’lim al-muta’allim li ta’allum jarīq al-ilm, Kāsan, 1898, (comp. 1203), p. 113.
67 The Arabic text reads: ‘yuqawwī al-‘umūr’; cf. Lane, op. cit., note 15 above, vol. 5, pp. 2154–5; ‘umr: “The flesh that is between the teeth.”
68 al-Washshā’, op. cit., note 27 above, Brünnnow edition, p. 141; Bellmann translation, vol. 2, p. 101.
69 The Arabs did not have specialists for dental diseases. Their treatment and cure was part of a physician’s work; cf. Ullmann, op. cit., note 35 above, p. 215. Ullmann also gives a survey of Arabic sources which discuss dental diseases (pp. 215–16). For many sources in translation see S. Elias Khalifah and L. Sami Haddad, ‘Dental gleanings from Arabian medicine’, J. Am. dent. Assoc., 1937, 24: 944–55, and ‘Arabian description of dental caries in the tenth century’, ibid., pp. 1847–1952, as well as Spies, op. cit., note 41 above.
70 See Ullmann, op. cit., note 35 above, pp. 115–19; Fuat Sezgin, Geschichte des arabischen Schrifttums, vol. 3, Medizin-Pharmazie-Zoologie-Tierheilkunde bis ca. 430 H., Leiden, E. J. Brill, 1970, pp. 247–56.
71 See Ullmann, op. cit., note 35 above, p. 118; Sezgin, op. cit., note 70 above, vol. 2, p. 117, no. 10 gives as the title: Qaul fi hifẓ al-asnān wa-stišāhīhā.
72 See Ullmann, op. cit., note 35 above, pp. 128–36; Sezgin, op. cit., note 70 above, pp. 274–94.
73 K. al-ḥāwī, 23 vols, Hyderabad and Deccan, Osmania Oriental Publications Bureau, 1952–1974.
74 Op. cit., note 73 above, vol. 3, pp. 107–8.
75 ḥafra, cf. Lane, op. cit., note 15 above, vol. 2, p. 600: “A scaling in the roots of the teeth or a rottenness . . . or an erosion of the roots of the teeth by a yellow incrustation between those parts and the gum . . . or a cankering of the teeth or a yellowness upon the teeth.”
teeth. This happens because the sticky natural moisture contained in the edges of the gums which helps the gums to stick to the teeth is annihilated by [the persistent use of toothbrush] and warm toothpowders."\textsuperscript{76} It is clear that in his medical practice Ḥunayn often treated patients who suffered from diseases of the teeth caused by an excessive use of toothbrush and toothpick. While recognizing their wholesome effect when used moderately, Ḥunayn warns emphatically against their excessive use. It is very probable that these patients belong to the same section of the population as those mentioned by al-Washšāf, namely, the common people.

Īsā b. Māşawayh,\textsuperscript{77} also quoted by al-Rāzī, remarks: "The toothbrush (siwāk) dries the tongue and is good for the foul breath of the mouth; it purifies the brain, refines the senses, polishes the teeth, and strengthens the gums. Everyone should take that kind of toothbrush that suits him".\textsuperscript{78} As a remedy for those suffering from weak gums he advises dipping the toothbrush in extract of roses\textsuperscript{79} and rubbing the teeth with red sandalwood\textsuperscript{80} and cubeb pepper,\textsuperscript{81} of each one part; half a part of the ashes of reed;\textsuperscript{82} half a part of "seafoam";\textsuperscript{83} pyrethrum and mountain raisins,\textsuperscript{84} of each one sixth of a part; and one third of a part of fragrant aloewood.\textsuperscript{85}

The close similarity between his praise of the siwāk and that of al-Washšāf is remarkable as the following table shows:

\textsuperscript{76} Op. cit., note 73 above, vol. 3, p. 113.

\textsuperscript{77} It is reasonable to assume that this name is a mistake of the Hyderabad printed text of the K. al-hāwī for the well-known physician ʿUyūn ibn Māşawayh (777–857), who, according to Ibn ʿAbī Uṣaybiʿa ('Uyūn al-anbāʿ, 255), composed a treatise on the siwāk called K. fi al-siwaik wa-al-sanūnāt.

\textsuperscript{78} Op. cit., note 73 above, vol. 3, p. 150.

\textsuperscript{79} māʿ al-ward, cf. Dietrich, op. cit., note 14 above, bk 1, no. 68.

\textsuperscript{80} sandal al-ward, cf. Werner Schmucker, 'Die pflanzliche und mineralische Materia medica im Firdaus al-hikma des 'Ali ibn Sahl Rabban al-Tabarî', (diss.), Bonn, 1969, pp. 282–3, no. 461: "Das rote (Sandalholz) von: Santalum album L. (Santalaceae)."

\textsuperscript{81} kābab: cf. Wörterbuch der klassischen arabischen Sprache, Wiesbaden, Otto Harrassowitz, 1970 ff, vol. 1, p. 16: "Fruit of Piper cubeba L.": al-Kindi has cubeb in a drug for gum and mouth pustules, drugs for a sore throat, a Jewish tooth medicine, and a tooth powder that polishes the teeth, removes decay, and protects the mouth (Levey, op. cit., note 32 above, p. 321, no. 249).

\textsuperscript{82} qasab, cf. Dietrich, op. cit., note 14 above, bk 1, no. 54: "Qaṣab ist eine allgemeine Bezeichnung für zahlreiche, meist hochschäftige Pflanzen."

\textsuperscript{83} zabād al-bahr, cf. Dietrich, op. cit., note 14 above, bk 1, no. 9, n. 3: "aus Schwämmen, Algen u.a. Substanzen bestehende Restprodukte, die vom Meer ausgeworfen worden (άλκυόνιον bei DG V 118 oder άθορχής V 119);" J. M. Riddle, Dioscorides on pharmacy and medicine, Austin, University of Texas Press, 1985, p. 158: άθορχής: "various species of zoophytes, άθορχής: a slaty efflorescence on the herbage of marshes (probably calcium chloride and other salts);" Levey, op. cit., note 32 above, p. 272, no. 118: "Cuttle fish bone, jellyfish, and others. The Ar. name may refer to many different things. Later, it seems to have settled into the meanings given above"; al-Kindi employs it in a prescription for arresting the deterioration of the gums and in other dentifices.

\textsuperscript{84} maywīzaj, cf. Dietrich, op. cit., note 14 above, bk 4, no. 141: "Diese Wilden oder Bergrozin sind die schwarzen Samenkörner von Delphinium staphisagria L., Srophans- oder Läusekörner, Samen des Scharfen Rittersporn, Ranunculaeaceae."

\textsuperscript{85} ʿūd, cf. Dietrich op. cit., note 14 above, bk 1, no. 19: "Das Wort ʿūd "Holz", dann "Aloeholz", steht, wie in diesem Kapitel fast durchweg entsprechend seiner Herkunft für ʿūd hindī, die indische Aloe. Es handelt sich wahrscheinlich um Aqualaria agallocha Roxberg (Alōxyylon agallochom Lour.), Aloë-Holz, Thymelaeaceae"; al-Kindi has aloewood in a prescription to remove the decayed part of teeth, to treat bad breath, to polish the teeth, and to protect the mouth (Levey, op. cit., note 32 above, pp. 307–8, no. 210).
The miswāk, an aspect of dental care in Islam

‘Īsā b. Māsawayh al-Washshā’
1) dries the tongue dries the phlegm
2) is good for the foul breath of the mouth is good for the foul breath of the mouth
3) purifies the mind purifies the mind
4) refines the senses makes the sight clear and sharp
5) polishes the teeth whitens the teeth
6) makes the gums strong strengthens the gums

This kind of recommendation which does not refer to the negative aspects of the use of the siwāk, and which is probably derived by one author from the other, is obviously a kind of more general statement also used by non-physicians.86

Ibn al-Jazzār, author of the influential medical compendium Zād al-musāfīr (Viaticum), remarks as part of a treatment of someone suffering from a bad smell of the mouth (bakhr) that he should brush his teeth continuously with toothbrushes (wa-yuwāžib ‘alā al-siwāk bi-l-masāwīk)88 prepared from palm-branches89 and from the arāk tree.90 Ibn al-Jazzār mentions the miswāk and recommends its frequent use only in this specific case. We therefore do not know if he would recommend or reject such a frequent use for the general preservation of the health of one’s teeth.

Ibn Sīnā91 states in a chapter on the preservation of the health of the teeth that if someone wants his teeth to remain intact he should observe eight things:

1) He should not take too often certain kinds of food and drink which corrupt quickly in the stomach, such as milk, salt fish, šahnā.92
2) He should not vomit continuously.
3) He should avoid chewing that which is tough and hard to chew (‘alik).
4) He should avoid breaking [with his teeth] hard (šulb) things.
5) He should avoid that which sets his teeth on edge (muḍarrisāt).
6) He should avoid everything which is very cold, especially after something warm, and something which is very warm, especially after something cold.
7) He should persist in cleaning his teeth with a toothpick, but not in an extreme and

86 “The siwāk takes away rottenness (hafr) (of the teeth) and strengthens the gum”, cf. Diyā’ al-Dīn ‘Abd Allāh b. Aḥmad ibn al-Bayṭār, K. al-Jāmi’ li mufradāt al-adwiya wa-al-aghdhiya, 4 parts in 2 vols, repr. Beirut, n.d., vol. 1, p. 140.
87 Cf. Ullmann, op. cit., note 35 above, pp. 147–9; Sezgin, op. cit., note 70 above, pp. 304–7.
88 MS Berlin 252, fol. 13b reads: “wa-yuwāžib ‘alā al-tasāwuk bi-l-siwāk”; MS Oxford 302, fol. 18a reads: “wa-yuwāžib ‘alā al-tasāwuk bi-masāwīk”.
89 “sa’af”, Lane, op. cit., note 15 above, vol. 4, p. 1365: “palm-branches”.
90 Zād al-musāfīr, bk 2, ch. 23, MS Dresden 209, fol. 67a.
91 ‘Alī ibn Sīnā, op. cit., note 35 above, Kitāb 3, Fann 7, p. 184.
92 Lane, op. cit., note 15 above, vol. 4, p. 1656: “A certain condiment, or seasoning, made of fish, of small fish, which has the property of exciting appetite, and rectifying the state of the stomach”.

---
immoderate way (min ghayr istiqā’ wa-ta’addin) which might cause injuries to the gums and the flesh between the teeth and remove it from there or move the teeth. 

8) He should avoid those things which are especially harmful for his teeth, such as leeks,\(^93\) which are very harmful for the teeth and the gums, and the other drugs which I have mentioned in the chapter on the simple drugs.

Concerning the use of the toothpick, Ibn Sinā makes the same reservation as Hunayn, namely, that one should use it in a moderate way. About the toothbrush he then remarks:

The toothbrush should be used in a moderate way (bi-l-i’tidāl), one should not use it to excess because this takes away the whiteness and moisture of the teeth and makes them disposed to receive the deflections and vapours which arise from the stomach and which then cause a fissure. But when one uses the toothbrush in a moderate way one gets white and strong teeth and strong gums, one prevents rotten teeth (ḥafr), and it is good for foul breath.\(^94\)

It is clear that in the case of the toothbrush Ibn Sinā had the same kind of experience as Hunayn; he therefore, like him, warns against its excessive use. 

Al-Majūs,\(^95\) author of the famous K. kāmil al-šīnā’ al-ṭibbiyya which is also called al-Kitāb al-malakī, states in a chapter entitled “On the regimen of the bodies the members of which suffer from harm caused by a bad temperament”:

If someone’s teeth are set on edge (daras) he should take purslane\(^96\) and coarse salt,\(^97\) but he should be careful not to take ice-cold water after a warm meal, and he should guard himself against the occurrence of rotten teeth (ḥafr) by brushing his teeth in a moderate way without exaggerating (bi-l-siwāk al-mu’tadīl min ghayr īfrāt) with sweet things such as burned barley flour,\(^98\) burned wormwood,\(^99\) “seafoam”... One of the things which strengthens the teeth and the gums and is good for bad breath is to use a toothbrush (siwāk) from wood containing bitterness and astringency with sweet

\(^93\) kurrāth, “leek (Allium porrum L.)”, cf. Wörterbuch, op. cit., note 81 above, vol. 1, pp. 119–20.

\(^94\) Op. cit., note 35 above, Kitāb 3, Fann 7, p. 184.

\(^95\) Cf. Ullmann, op. cit., note 35 above, pp. 140–6.

\(^96\) al-baqla al-hamqā, cf. Dietrich, op. cit., note 14 above, bk 2, no. 106: “Portulaca oleracea L., Portulak, Burselkraut, Portulacaceae”; Levey, op. cit., note 32 above, pp. 244–5, no. 41: “The seeds [of purslane] are used for a mouthwash.”

\(^97\) al-miḥl-al-jarīsh, cf. Lane, op. cit., note 15 above, vol. 2, p. 410, jarīsh: “applied to salt it signifies mā laam yutayyab [app. meaning such as has not been purified]”.

\(^98\) daqīq al-shīr, cf. Dietrich, op. cit., note 14 above, bk 2, no. 72: “Stamppflanze für die Gerste ist Hordeum vulgare L. und Var., Gramineae”; al-Kindī uses it in a dental medicine to “sweeten the teeth and to strengthen the gums” (Levey, op. cit., note 32 above, p. 293, no. 168).

\(^99\) shīh, cf. Dietrich, op. cit., note 14 above, bk 3, no. 26: “ist bei den Arabern anscheinend Sammelname für viele oder alle Beißfassarten”; al-Kindī employs Armenian wormwood in a tooth medicine to polish the teeth, remove the decay, treat bad breath, and protect the mouth (Levey, op. cit., note 32 above, p. 296, no. 177).
cyperus, lemon-grass and red alum. One should, however, not use the toothbrush too much because it abrades (ṣahāja), corrupts (afsada) and decreases (naqāṣa) the gums, and it moves the teeth. But one should rub (dalaka) one’s teeth with a coarse piece of cloth with a cleaning toothpowder if one wants them to be clean and white.

In a chapter dealing with the stench and bad breath of the mouth which is caused by corruption (uṣūna) of the flesh in the mouth, or by corruption (taʿaffun) and decay (taʾakkul) of the teeth, or by corrupt (ʿafin) phlegm in the stomach, he describes a compound medicine to be chewed and then states: “The patient should use the toothbrush (siwāk) continually according to my prescription with sweet cyperus, and white sandalwood, for this is beneficial for a bad smelling mouth.” As in the previous cases al-Majūsī recognises the value of a moderate use of the siwāk but warns against excesses.

Concerning the toothpick, Ibn Buṭlān states that one should not use it continuously between the teeth, about the siwāk he says that it should be used with a piece of linen moistened with extract of roses. It is probable that this advice is intended to prevent damage to gums and teeth.

In summary, it may be said that there was a pre-Islamic custom of cleaning the teeth with the siwāk to get them white and shiny. Although we do not know the extent to which the siwāk was used during the pre-Islamic period, it was certainly very popular in the Islamic period. We can derive this from the different Ḥadīth narrations about the intensive use of the siwāk by the Prophet. For these stories try to authorize a current practice by attributing it to him and by setting him as a standard. Probably due to the literal imitation of the Prophet, the siwāk became so excessively used by the common people that it caused a twofold response: 1) from the educated elite who felt the need to limit the use of the siwāk to certain times and places, 2) from the physicians who strongly recommended the moderate use of the siwāk, because in this manner it would whiten the teeth and strengthen the gums. But its immoderate use, according to them, would injure the gums and displace the teeth. Thus, their warning in this respect is loud and clear.

100 suʿd, cf. Dietrich, op. cit., note 14 above, bk 1, no. 4: “Gemeint ist wohl Cyperus longus L. und Var., der Wilde Galgant, Cyperaceae”; al-Kindī uses it in a toothpowder to polish the teeth and to treat bad breath (Levey, op. cit., note 32 above, p. 282, no. 143).
101 shabb, cf. Schmucker, op. cit., note 80 above, p. 259, no. 418: “Alaun, Alumen, Aluminium-Kaliumsulfat. Meist bezeichnet der Name eine Mischung mehrerer Sulfate”; for the red variety cf. Dietlinde Golz, Studien zur Geschichte der Mineralnamen in Pharmazie, Chemie und Medizin von den Anfängen bis Paracelsus, (Sudhoffs Archiv, Beiheft 14), Wiesbaden, Franz Steiner Verlag, 1972, p. 233, note 52 (quoting M. Scotus’ Ars Alchemiae: “alumen rubeum quod venit de Hanlap (= Aleppo)”; al-Kindī employs Yemenite alum in a drug for toothache and in dentiﬁres (Levey, op. cit., note 32 above, p. 291, no. 164).
102 MS Ayasofia 4713 a, facs. ed. Frankfurt am Main 1985, pt 2, ﬁrst half, ch. 17, pp. 60–1.
103 Op. cit., note 102 above, ch. 79, 425ff.
104 sandal abyād, cf. Schmucker, op. cit., note 80 above, pp. 282–3, no. 461: “Das weisse Sandelholz von: Santalum album L. (Santalaceae).” Al-Kindī employs it in a toothpowder, cf. Levey, op. cit., note 32 above, pp. 298–9, no. 183.
105 Ibn Buṭlān, op. cit., note 37 above. The Arabic text reads: “yukrah li-l-insān ... wa-maḏr mā yukasiruḥā wa-al-ilḥāb bi-l-khilāl baynahā”. Elkhadem’s translation (p. 215) for baynahā: “dans les intervalles” should be corrected to “between them”, namely, the teeth. Ibn Buṭlān makes this statement while referring to three authors, namely, al-Rāzī, Bakhīthshū and Yūḥannā.
106 Ibn Buṭlān, op. cit., note 28 above, p. 215.