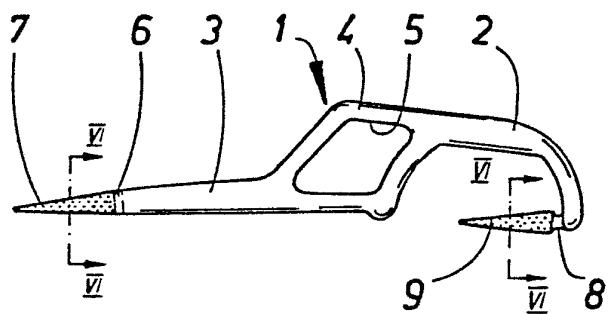




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: DENTAL HYGIENE TOOL



(57) Abstract

A dental hygiene tool adapted for cleaning the gap between adjacent teeth. The tool comprises, in combination, a thin, elongated element (7) which is gripped between the ends of a yoke-shaped portion (2) and which is adapted to be introduced from the outside into the gap between the teeth, to clean the same, a hold portion (3) which originates from one end of the yoke-shaped portion (2) and which is adapted for holding the tool (1), and at least one stick-like portion (5) which is disposed at the outer end of the last-mentioned portion (3) opposite the yoke and which is adapted to be connected to said holder portion (3) substantially at right angles thereto, and which is adapted to be introduced into the gap between the teeth from the side and which comprises an outer point and surfaces adapted to the shape of the gap between the teeth, which surfaces are at least partially provided with brush members (11).

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Dental hygiene tool

Technical field:

In preventive dental hygiene, the object of which
5 is to reduce the risk of caries attack, cleaning of
the teeth is the most important measure. It has been
found that brushing the teeth is not sufficient but
that for cleaning the space between the teeth, cleaning
is additionally necessary by means of tools which
10 penetrate in between the teeth. The invention relates
to such a dental hygiene tool.

Background art:

A number of different tools for this purpose are
already known. One type is the tooth stick which,
15 in its most developed form, has a triangular cross-
section adapted to the shape of the gap between the
teeth and also brushing members for an effective
cleaning of the tooth surfaces during movement backwards
and forwards in the gap between the teeth. An alter-
20 native to the dental stick is dental thread which has
the advantage that it can be taken down into the gap
between the teeth from the chewing surfaces and so
clean the whole area and which, moreover, reaches
the part of the gap between the teeth adjacent to the
25 mouth better than a stick introduced from the outside
does. An attempt has been made to eliminate the
disadvantage of the thread of being relatively thin
by providing it with brush-like thickened portions, but
this only led to a very incomplete adaptation to the
30 shape of the gap between the teeth in comparison with
what can be achieved with the dental stick constructed
as a rigid body. Use of a dental thread also means



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that the fingers which hold the inner end of the thread must be introduced into the mouth during the cleaning operation, which is both inconvenient and unhygienic.

The technical problem:

5 An attempt to improve these conditions by means of a holder for the thread has led on the one hand to permanent tools in which the thread must be mounted before use, something which is time-consuming and difficult, or tools of a throw-away character where
10 a thread is moulded onto a plastics holder, something which for its part led to a tool which, in relation to its short life, was relatively expensive because of the increase in moulding costs which the insertion of a foreign element such as a thread must always
15 involve.

One disadvantage of a member such as a thread which is fixed at both ends is that it always requires a wide open space for its introduction. Such a member therefore cannot be used with bridges which
20 extend over the gap between the teeth.

Thus dental sticks and threads each have their own specific disadvantages and advantages. One disadvantage which they share, however, is that neither with dental sticks of the conventional construction
25 nor with a thread is it possible to clean the gap between the teeth which are inside the side of the mouth. For this an angular tool is required which is so constituted that a short, pointed dental stick is secured at right angles to a shank. If this dental
30 stick is made triangular, which is desirable for the sake of effectiveness, the dental stick must be turned in the holder to assume the correct position for the different directions of insertion which must be used. Thus this leads to a relatively complicated tool and
35 such tools with rotatable dental sticks set at an angle are likewise known. In an attempt to combine



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the advantages of the dental stick and the dental thread in a single tool, a tool has been developed in which the thread is gripped in a yoke from which a handle originates for holding so that the thread 5 can be introduced into the mouth without needing to hold its inner end. Said handle is formed like a dental stick at its end. Despite this, the tool does not offer any satisfactory possibility for cleaning the gap between the inner teeth. Despite the 10 proposals for various solutions and combinations which are represented in the prior art, no simple, cheap single tool has thus been found which covers all types of tooth cleaning needs besides brushing the teeth.

15 . The solution:

The advantages of the invention are achieved by a dental hygiene tool which comprises a yoke-shaped portion with a tool member and also a second, outer stick portion for cleaning the teeth. Preferably 20 disposed in the yoke-shaped portion as a tool member is a stick portion with an inner end which is fixed to the yoke-portion and an outer free end which forms a point. The point of the stick portion is directed in towards the gap in the yoke portion and has such 25 a spacing from the yoke portion that this can be taken over two adjacent teeth with the stick portion inside these teeth.

Advantages:

The object of the present invention is to provide 30 a tooth cleaning tool adapted for cleaning the gap between the teeth and so constitute a complement to the toothbrush, which tool renders possible a convenient and effective cleaning of all the gaps between the



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teeth while taking advantage of the advantages which the use of dental sticks, dental thread and dental sticks set at an angle each offer individually.

Another advantage aimed at by the invention has 5 been to provide a dental hygiene tool of said complete kind which can be manufactured at a low cost so that a construction for use once only or a few times is rendered possible.

Furthermore, a tool has been achieved which 10 permits cleaning of the teeth if a bridge extends over a gap between the teeth.

Description of the Figures:

Two forms of embodiment of the dental hygiene tool according to the invention are shown on the 15 accompanying drawings. Figure 1 shows the first form of embodiment in a side view; Figure 2 shows the second form of embodiment in a side view; Figures 3, 4, 5 and 6 show, on a larger scale than Figures 1 and 2, cross-sections on the lines III-III, IV-IV, V-V 20 in Figure 2 and VI-VI in Figures 1 and 2; Figure 7 shows the first form of embodiment in a view from above which also shows that parts of the tool are flexible.

Preferred forms of embodiment:

25 As can be seen from Figure 1, a dental hygiene tool according to the first form of embodiment of the invention consists of a single body 1 which is preferably made by injection moulding of plastics material. The plastics body 1 comprises a yoke portion 2 with the 30 general shape of a semicircular arc, a handle portion 3 and a holder portion 4 situated between these two portions. The holder portion 4 is formed from portions of material which surround a hole 5 like a frame, which affords a satisfactory finger grip. The actual tool



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members of the tool are two and consist of a first stick portion 7 originating from the handle portion 3 and a second stick portion 9 originating from the outer end of the yoke portion 2 opposite the holder portion 4. The stick portion 9 should be directed in the same direction as the handle portion 3 and its point thus comes to be directed towards the end of the yoke portion 2 connected to the holder portion. It must be seen to that there is adequate space between this part of the yoke portion and the point on the stick portion 9 to be able to guide the point down inside a tooth with the end of the yoke portion outside this. A gap to the yoke portion corresponding to the height of a tooth must be provided inside the stick portion 9. Both gaps should be of the order of magnitude of 8 mm.

The two stick portions 7 and 9, which are substantially alike, are connected by means of hinge portions 6 and 8 to the handle portion 3 and the yoke portion 2 respectively.

The cross-section of the stick portions 7 and 9 can be seen from Figure 6. Thus it is triangular and may comprise a large number of relatively short brush members 11 which are produced during the moulding of the plastics material. The brush members 11 may appropriately be arranged in rows which are set obliquely (See Figures 1 and 2) so that the whole of the distal surfaces worked on surrounding teeth are exposed to satisfactory brush action. The hinge portions 6 and 8 are narrow portions in the material which, using the flexibility of the material, permit swinging of the stick portions 7 and 9 to both sides so that they can be set in different angular positions, for example at right angles to the common line in which the handle portion 3 and the yoke portion 2 extend, as can be seen from Figure 7.



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The under side 15 of the stick portions is concave for adaptation to the shape of the gum papilla in the gap. As a result of the contact between the under side and the papilla which is obtained, massage of the papilla is brought about with cleaning of the gap with the respective stick portion.

As can be seen from Figure 2, a dental hygiene tool according to the second form of embodiment also consists of a single body 21 preferably made by injection moulding of plastics material. The plastics body 21 comprises a yoke portion 22 with the shape of a semicircular arc, a handle portion 23 with a substantially triangular holder portion 24, a stick portion 27 which is connected to the handle portion 23 by means of a hinge portion 26, and a blade portion 28.

As can be seen from the cross-sections in Figures 3, 4 and 5, the blade portion 28 has three cross-sectional shapes merging successively into one another. The first cross-sectional shape as shown in Figure 3 is closest to the handle portion 23 and this cross-section ends at both sides on the one hand outwards and on the other hand in towards the interior of the yoke portion 22, in edges 29 and the portion can be said to be double-sided knife shaped. In the middle of the blade portion 28, its cross-section is angular in rectangular shape with sharp corners 30 and furthest out the blade portion merges into triangular shape with a plurality of relatively short brush members 31 produced during the plastics forming. The stick portion 27 has substantially the same construction as the stick portions 7 and 9.

When the teeth are to be cleaned with the tool shown in Figure 1 and this is to be effected from the outside, the stick portion 7 is used. The surfaces of the triangular cross-section provided with brush members 11 is allowed to slide against the tooth surfaces 16 (see Figure 5) during the cleaning operation.



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As mentioned above, a massage of the gum papilla is effected at the same time by the rubbing of the under side 15 against the papilla. During cleaning of the front teeth, the stick portion 7 can be allowed to 5 point straight out as shown in Figure 1. During cleaning of the inner teeth it can be folded at an angle to the handle portion 3. This is effected by bending in the hinge portion 6. During cleaning of the lower teeth on the right-hand side as during 10 cleaning of the upper teeth on the left-hand side, the stick portion 5 must be bent away, seen in Figure 1, while it is bent in the opposite direction during cleaning of the upper teeth on the right-hand side and the lower teeth on the left-hand side. As a result 15 of this, the sides provided with brush members always come into contact with the tooth surfaces 16. As a result of the placing of the brush members on concave surfaces, substantially adapted to the curvature of the distal surfaces, an evenly distributed brush 20 effect is obtained. As a result of suitably balanced deformability both in the brush members 11 and in the body of the stick portion, a satisfactory adaptability of the tool with regard to the curvature of the distal surfaces is obtained in the horizontal plane.

25 Nevertheless, complete cleaning cannot be effected only from one side of the gaps between the teeth, but both sides must be attacked. The stick portion 9 is intended for this purpose and should be introduced into the gaps between the teeth from the inside. The 30 yoke portion 2 is guided over the abutting teeth between which cleaning is to take place so that the tip of the stick portion 9 comes close to the gum in the intended space between the teeth. Then the tool is pulled outwards so that the stick portion 9 penetrates 35 in between the teeth. After that, cleaning is effected in the manner described with reference to the stick portion 7. In this case, too, the tool can be bent



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in relation to the stick portion so that better accessibility is obtained, for example to the inner teeth inside the corners of the mouth. As distinct from earlier tools, the stick portion 9 renders possible 5 cleaning from the inside even if there is a bridge or close contact between the teeth which does not permit introduction of an element in the direction from the chewing surface and down to the gum.

In the other form of embodiment as shown in Figure 10 2, the blade portion 28 and the stick portion 27 constitute the cleaning elements of the dental hygiene tool. The blade portion 28 is intended to be introduced between the teeth in approximately the same manner as a dental thread. The section with the cross-section 15 shown in Figure 3 is guided from the outside in the direction of the chewing surfaces to the slit between two adjacent teeth and by means of the outwardly directed edges 29, the blade portion 28 is guided in between the teeth, past the contact point between them 20 and down to the widening gap close to the gum. The thin, pointed shape of the cross-section on the line III-III renders this introduction possible. The spacing between the under side of the blade portion 28 and the under side 25 of the yoke portion 22 is adapted 25 to normal tooth height, as a result of which a certain support is obtained during use of the blade portion. After the introduction, the blade portion 28 is pulled outwards somewhat so that the cross-section IV-IV is in said gap. Here the cross-section as shown in. 30 Figure 4 is somewhat larger and here the blade portion can be used to scrape the tooth surfaces by means of the edges 30. On pulling out to the cross-section V-V, the triangular shape is reached which fits closely against the tooth surfaces and can remove loose particles 35 and collect these by means of the brush members 31. Finally, removal of the blade portion 28 from the gap between the teeth is effected in that the cross-section



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III-III is again brought in front of the teeth. The inner points 29 now facilitate the removal of the blade portion 28 through the gap between the teeth becoming narrower towards the outside.

5 When handling the tool, the holder portion 24 of the handle portion 23 is grasped with the thumb and forefinger and the holder portion 24 may appropriately have a surface increasing the friction. As should be clear, the handle portion 23 is directed outwards
10 from the mouth during the cleaning operation. The yoke portion 22 is adapted to hold the thin blade portion 28 taut, which renders possible a freer design of this portion than would be possible with a stick.

If so desired, the stick portion 27 can alternatively
15 be used for the cleaning as previously described with reference to Figure 1. The blade portion 28 cannot be used for cleaning the inner teeth inside the corners of the mouth, but the portion 27 is intended for this.

The invention is not limited to the examples
20 described above and shown on the drawing but can be modified within the scope of the following patent claims. For example, the blade portion can be given a simpler construction in which at least some of the cross-sectional shapes shown are eliminated. The
25 brush members 10, 11 can also be eliminated or be constructed and arranged differently. They may, for example, consist of a plurality of brush threads secured in the stick portion or the blade portion respectively. The holder portions 4 and 24 are
30 selected only as examples and are not bound to any specific form of embodiment.



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Patent Claims:

1. A dental hygiene tool adapted for cleaning the gap between adjacent teeth and comprising a yoke-shaped portion (2, 22) which carries a tool portion (9; 28) adapted for introduction between the teeth and which is connected to a holder portion (4; 24) which is adapted for gripping the tool with the fingers, characterised in that the tool portion in the yoke-shaped portion (2) is a stick portion (9) disposed in a position opposite to the holder portion (4) with an inner end which is secured to the yoke portion (2) and an outer, free end, which forms a point, the point of the stick portion being directed inwards towards the gap which is formed between the outer portions of the yoke portion, and being at such a distance from the yoke portion adjacent to the point that the yoke portion can be guided over two adjacent teeth with the stick portion (9) inside these and the holder portion (4) outside.
2. A dental hygiene tool as claimed in Claim 1, characterised in that the tool comprises, in combination on the one hand said tool portion (9; 28) in the yoke-shaped portion (2; 22) and on the other hand also a second stick portion (5; 27) disposed at the outer end of the holder portion (4; 24) opposite the yoke portion.
3. A dental hygiene tool as claimed in one of the Claims 1, 2, characterised in that the stick portion or stick portions (7, 9; 27), which are adapted to be introduced into the gap between the teeth from the side, comprise an outer point and surfaces adapted to the shape of the gap between the teeth, which surfaces are at least partially provided with brush members (11).
4. A dental hygiene tool as claimed in one of the Claims 1 or 3, characterised in that the tool portion in the yoke-shaped portion (22) is a ^{thin} elongated element



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(28) gripped between its ends, the thin, elongated portion (28) being blade-shaped and made integral with the yoke-shaped portion (22).

5 5. A dental hygiene tool as claimed in Claim 4, characterised in that the blade-shaped element (28) comprises a plurality of different cross-sections, at least one first cross-section with edge portions merging into sharp edges (29), adapted to facilitate the introduction of the blade-shaped portion between 10 the teeth and at least one second cross-section (30) with members, such as edges and/or brush members (31) adapted for cleaning of the tooth surfaces adjacent to the gap between the teeth.

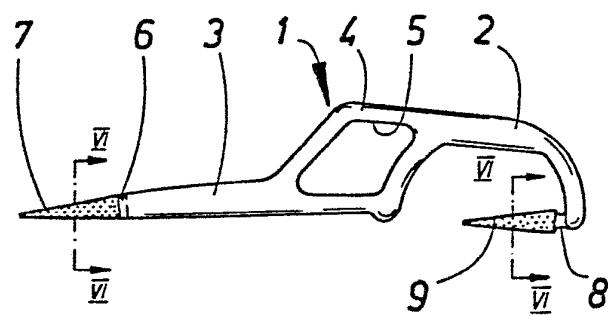
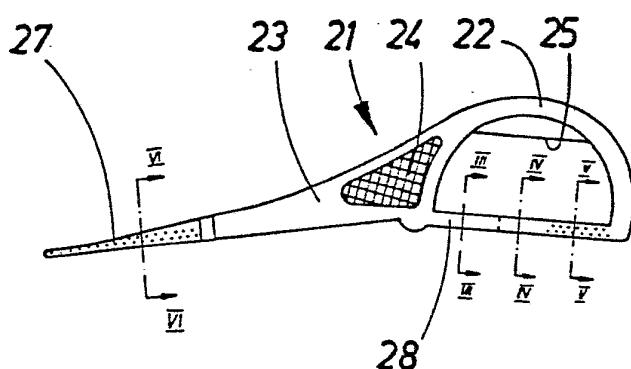
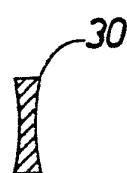
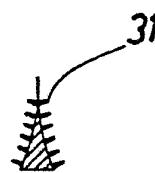
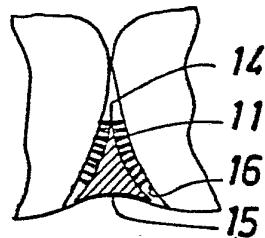
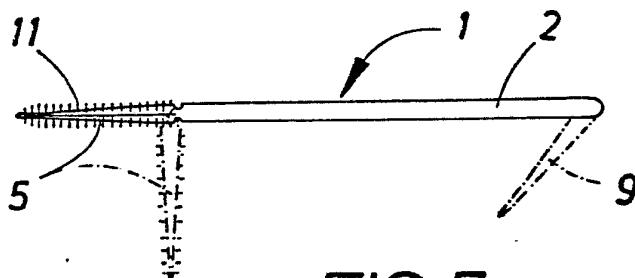
15 6. A dental hygiene tool as claimed in Claim 5, characterised in that the blade-shaped portion (28), apart from the first cross-section, comprises two further cross-sectional shapes, of which one cross section is adapted with sharp edge portions (30) for cleaning the tooth surfaces by scraping and the 20 other cross-section is equipped with brush members (31) for cleaning the tooth surfaces by brushing.

25 7. A dental hygiene tool as claimed in one of the preceding Patent Claims, characterised in that the stick portion or stick portions (7, 9; 27) are connected to the holder portion (3) by means of an articulated connection (6; 26) which renders possible said angular setting to the holder portion.

30 8. A dental hygiene tool as claimed in Claim 7, characterised in that the articulated connection (6; 26) consists of a weakened portion of material situated in the transition between the holder and stick portions made of a common piece of material.

35 9. A dental hygiene tool as claimed in one of the preceding Claims, characterised in that the stick portion or portions (7, 9; 27) have a substantially triangular cross-sectional shape with concave sides, of which two sides situated symmetrically to one another comprise brush members (11).



FIG. 1FIG. 2FIG. 3FIG. 4FIG. 5FIG. 6FIG. 7

INTERNATIONAL SEARCH REPORT

International Application No. PCT/SE81/00272

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³

According to International Patent Classification (IPC) or to both National Classification and IPC 3

A 61 C 15/00

II. FIELDS SEARCHED

Minimum Documentation Searched ⁴

Classification System	Classification Symbols
IPC 3	A 61 C 15/00, A 61 H 13/00
US Cl	128-62, 132-89, 93
National Cl	30b:18; 30f:6/05

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched ⁵

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴

Category ⁶	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	US, A, 2 827 045 published 1958, March 18, Dicner	1, 2
X	US, A, 3 368 553 published 1968, February 13, Kirby	1, 2
Y	CH, A, 521 751 published 1972, June 15, Schindler	1, 2
X	DE, C, 347 760 published 1922, January 26, Marks	4, 5
Y	SE, B, 374 999 published 1975, April 7, Axelsson	3, 9
Y	US, A, 3 771 537 published 1973, November 13, Schole	7, 8
Y	DE, C, 172 521 published 1905, April 11, Bruns	7
Y	SE, A, 7902752-0 published 1980, September 29, Larsson	3, 9

* Special categories of cited documents: ¹⁵

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

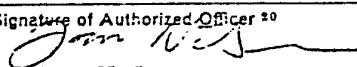
"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search ⁹
1981-11-18

Date of Mailing of this International Search Report ¹⁰
1981-11-27

International Searching Authority ¹¹
Swedish Patent Office

Signature of Authorized Officer ¹²

Jan Nilsson

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE¹⁰

This International search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. Claim numbers because they relate to subject matter¹² not required to be searched by this Authority, namely:

2. Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out¹³, specifically:

VI. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING¹¹

This International Searching Authority found multiple inventions in this International application as follows:

Claims 4-6 are independent of other claims.

1. As all required additional search fees were timely paid by the applicant, this International search report covers all searchable claims of the International application.

2. As only some of the required additional search fees were timely paid by the applicant, this International search report covers only those claims of the International application for which fees were paid, specifically claims:

3. No required additional search fees were timely paid by the applicant. Consequently, this International search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

- The additional search fees were accompanied by applicant's protest.
- No protest accompanied the payment of additional search fees.