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INTERPROXIMAL BRUSHBackground of the Invention

The present invention relates to interproximal brush devices for oral care and more particularly to a
 5 brush of the type in which a disposable brush element is retained on a handle by a removable cap member.

A great number of devices exist in the prior art which have been developed for performing the cleaning of teeth and massaging of the gums. The
 10 brushes generally have bristles which rub or wipe perpendicularly across the gum and tooth surfaces, and one type of disposable brush has twisted wire bristles which are captured between, and extend radially from, a pair of twisted metal wires. One such brush is
 15 disclosed in U.S. Patent No. 4,780,923 issued to Peter Schultheiss on November 1, 1988 and assigned to the assignee of the present invention.

Other brushes which have been employed for similar usage are found in U.S. Patent No. 4,222,143 to
 20 Tarrson et al disclosing an interproximal brush handle utilizing a slidable sleeve to retain a brush, U.S. Patent No. 4,030,199 to Russel which discloses a handle for holding a stem mounted disposable brush and utilizes a slidable tapered sleeve for retaining the brush in a
 25 friction fit, U.S. Patent No. 3,559,226 to Burns which discloses a toothbrush having a metal handle for holding an interproximal brush with a holding chuck utilizing

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screw threads, knurling, or the like to retain the brush. Other patents which have been referred to in U.S. Patent 4,780,923 cited above are U.S. Patent No. 4,296,518 to Furrier et al which discloses a toothbrush
5 with fixed bristles and a gum massaging accessory which is pivotally attached to a handle and U.S. patent No. 4,319,377 to Tarrson et al disclosing an interproximal toothbrush which uses a threaded sleeve retainer for the disposable brush.

10 While the above cited U.S. Patent No. 4,780,923 discloses a device which has proven to be successful in the marketplace, it is considered that an improvement in the product could be made without a substantial increase in cost to the user, which would
15 provide a product more desirable to some of the users' needs.

It has been found that in the device shown in the aforementioned U.S. Patent 4,780,923 (which is herein incorporated by reference), the users in some
20 instances, when threading the stem of the brush member through a transverse hole in the handle, were leaving a gap of as much as one-quarter inch between the handle and the bristles of the brush. This leads to bending of the brush and in frequent instances would cause breaking
25 of the brush stem adjacent the handle.

It is also found that the clear color of the plastic employed in manufacturing the handle did not provide a distinct view of the transverse hole to many of the older users, therefore providing difficulty in
30 threading the stem of the brush into the handle.

It is therefore an object of the present invention to provide an interproximal brush, employing disposable brush member, which facilitates the threading of a brush stem into the handle.

35 It is a further object of the invention to provide an interproximal brush of the type described wherein the brush stem is given additional support

against breakage of the brush during use.

Summary of the Invention

The aforementioned objects, and other objectives which will become apparent as the description proceeds, are accomplished by providing an interproximal brush employing a disposable brush member which comprises an elongated handle having a disposable brush at one end thereof and a grip portion at the opposite end. The brush retaining means generally comprises opposed side surfaces and a bottom surface of the one handle end, a transverse hole formed in the handle and a longitudinal groove arranged for communication with the transverse hole. The bottom surface has a downwardly extending boss formed thereon and disposed with the transverse hole extending through the boss substantially at the centerline of the boss. A cap is mounted at the brush retaining end portion which includes a section adopted and arranged for overlying the longitudinal groove and the top end of the transverse hole.

A brush member is provided having a stem which is inserted through the transverse hole extending through the boss and the handle, and is retained in the groove. A radial protuberance may be provided extending laterally across the longitudinal groove adjacent the transverse hole to aid in bending a portion of the stem extending through the transverse hole, into the groove.

The boss is generally in the form of a frustrum, and may be molded as an integral part of the brush retaining means formed on the handle.

Brief Description of the Drawing

The foregoing and other features of the invention will be more particularly described in connection with the preferred embodiment, and with reference to the accompanying drawing, wherein:

Figure 1 is a top plan view showing an interproximal brush constructed in accordance with the teachings of the present invention;





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Figure 2 is a side elevational view partially in section showing details of the interproximal brush of Figure 1;

5 Figure 3 is a fragmentary sectional view showing details of a portion of the interproximal brush of Figures 1 and 2, taken on an enlarged scale for clarity;

10 Figure 4 is a front sectional view taken along the lines IV-IV of Figure 3 showing further details of the interproximal brush of Figures 1 through 3; and

Figure 5 is a front section view similar to Figure 4 showing an interproximal brush of the prior art.

Description of the Preferred Embodiment

15 Referring now to the drawing and in particular to Figures 1 through 4, there is shown an interproximal brush 10 comprising an elongated handle 12 having a grip portion 14 at one end thereof and a brush retaining means formed at the opposite end 16 thereof. The end 16
20 of the brush handle 12 containing the brush retaining means has a reduced thickness or diameter from that of the grip portion 14 and is bent upwardly at an angle from about 5° to about 25° with respect to the longitudinal axis of the handle 12, as best shown in
25 Figure 2 of the drawing. A transverse hole 18 extends through the brush retaining end 16 of the handle 12 and is in communication with a longitudinal groove 20 extending rearwardly from the hole 18.

The hole 18 is dimensioned to allow a stem 22
30 of an interproximal brush 24 to be easily inserted through the transverse hole 18 and to restrain movement of the twisting of the stem to any significant degree when the stem is positioned within the transverse hole. The interproximal brush 24 is similar to that shown in
35 the aforementioned U.S. Patent No. 4,780,923 and is one of a type well known in the art and generally available through normal trade outlets. The brush 24 is generally



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manufactured having bristles extending radially from the stem 22, the stem generally comprising a pair of twisted wires. Interproximal brushes of this type can be of the conical shape shown in Figures 1 through 4, or of the cylindrical shape shown in Figure 5. Additionally, the stiffness of the bristles can vary from degrees of softness to degrees of hardness and the bristles may be of natural or synthetic fibers with nylon fibers being preferred. Any of the several different types of interproximal brushes can be used in the handle of the present invention. Further details relating to interproximal brushes can be found in U.S. Patent No. 4,395,943.

The longitudinal groove 20 is designed to provide a lacking groove for capturing and retaining a length of the stem 22 which extends above the handle 12 when inserted into the transverse hole 18. Accordingly, groove 20 is of a dimension wide and deep enough to receive the stem 22 and long enough to receive a fairly precise length of stem, which will insure that the bristle portion 26 projects a predetermined distance beyond the brush retaining end 16 when the stem is bent downwardly and thrust into the groove 20.

A molded polymeric cap 28 is pivotably connected by a pin 29 and disposed to overlies the groove 20 and retain that portion of the stem 22 within the groove, when in the closed position. As best shown in Figure 4, the cap 28 has opposed side edges 30 which are flexible and are spaced apart by a dimension W. Dimension W is selected so that flexible edges 30 will flex outwardly when at least a portion of the edges engage opposed side surfaces 32 at the maximum thickness T of the brush retaining end 16. Accordingly, as edges 30 are pushed beyond maximum thickness T and the cap 28 is moved to its closed position, the flexed edges relax inwardly to approach and restore to dimension W between the edges. The flexible edges 30 therefore provide an



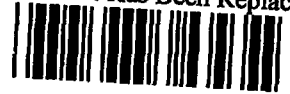
effective but simple means for releasable attachment of the cap 28 to the brush retaining end 16.

Flexible edges 30 therefore permit the cap 28 to be snapped over the brush retaining end 16 of the handle 12 and also permit disengagement of the cap when lifted upwardly to again flex edges 30 outwardly as the edges approach and reach the dimension T. The disengagement of the cap 28 can be facilitated by providing projections 34 extending outwardly from the cap 28 which can easily be lifted or pressed upwardly by a finger of the user.

Thus far, those elements described above are similar to those disclosed in the herein cited U.S. Patent No. 4,780,923 and it is considered that a further description of the cap structure is unnecessary, as details of the particular cap structures available may be found in the aforementioned patent.

Referring now to Figure 5, a prior art interproximal brush structure is depicted, the brush 10a comprising a handle having a grip portion and a brush retaining end 16a provided with a transverse hole 18a and longitudinal groove 20a. A brush 24a having a stem 22a is disposed in the handle 12a having a stem 22a and bristle portion 26a. A cap 28a is designed similar in dimension to that of the cap 28, and disposed on the brush retaining end 16a in similar manner to the cap 28 described above.

As previously discussed, the brush 24a has been threaded into the hole 18a and a gap G remains between the bristle portion 26a and the bottom surface of the brush retaining end 16 due to the misconception of the user that the brush has been threaded entirely into the transverse hole 18a. The lack of a stop surface and the employment of clear plastic for the material of the handle 12a all contribute to the user's allowing as much as a quarter inch of unsupported stem length to protrude beyond the bottom surface of the



handle 12a.

Referring back to Figures 1 through 4, it will be observed that a downwardly extending boss 36 is formed on the lower surface of the brush retaining end 16 having a central opening forming an extension of the hole 18. The boss 36 is in the shape of a frustrum and may be molded during fabrication of the handle 12. The boss 36 is provided with a stop in the form of surface 38 which contacts the more rigid portions of the bristle contained in the bristle portion 26, as best shown in Figures 3 and 4.

It will further be observed that a radial protuberance is provided in the groove 20 extending laterally across the groove adjacent the transverse hole 18 to aid in bending a portion of the stem 22 extending through the transverse hole and into the groove.

When employing the interproximal brush 10 of the present invention, the user, after opening the cap 28 by pivoting it about the pin 29, inserts the stem 22 of a brush 24 through the opening in the boss 36 and through the hole 18 until the bristle portion 26 contacts the surface 38 of the boss 36. There will be no doubt in the mind of the user that the brush 24 is in place in that the surface 38 provides a positive stop when the bristle portion 26 contacts the surface 38.

Introduction of a new brush into the interproximal brush 10 is now completed when the cap 28 is closed forcing the end of the stem 22 into the groove 20. By providing the protuberance 40, a radial bend is accomplished in the stem 22 which lessens the probability of breakage of the stem during use, at the point of bending. It will be appreciated that with the stem 22 supported as shown in Figure 3, the angle of the brush in relation to the handle 12 is maintained during usage by virtue of the ridged retention in the boss 36.

While it is apparent that changes and modifications may be made within the spirit and scope of

the present invention, it is my intention, however, only to be limited by the scope of the appended claims.

As my invention, I claim.

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C L A I M S

1. An interproximal brush employing a disposable brush member comprising:

an elongated brush handle having a brush retaining means formed at one end thereof and a grip portion at the opposite end thereof, said brush retaining means comprising opposed side surfaces and a bottom surface of said one handle end, a transverse hole formed in said handle end and a longitudinal groove arranged for communication with said transverse hole, said bottom surface having a downwardly extending boss formed thereon and disposed with said transverse hole extending through said boss substantially at the centerline thereof; and

a cap pivotably mounted at the said brush retaining end portion including a section adapted and arranged for overlying said longitudinal groove and the top of said transverse hole.

2. An interproximal brush as set forth in claim 1, which further includes a brush member having a stem which is inserted through said transverse hole extending through said boss and said handle, and retained in said groove.

3. An interproximal brush as set forth in claim 1, wherein said groove is in said one handle end portion.

4. An interproximal brush as set forth in claim 2, wherein said groove is in said one handle end portion and which further includes a radial protuberance extending laterally across said longitudinal groove adjacent said transverse hole to aid in bending a portion of said stem extending through said transverse hole into said groove.

5. An interproximal brush as set forth in claim 1, wherein said boss is in the form of a frustrum.

6. An interproximal brush as set forth in claim 1, wherein said brush retaining end portion is bent upwardly at an angle of from about 5° to about 25° with respect to the longitudinal axis of said handle.

7. An interproximal brush as set forth in claim 3,





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which further includes a brush member which is inserted through said transverse hole extending through said boss and said handle, and retained in said groove.

8. An interproximal brush as set forth in claim 7, which further includes a radial protuberance extending laterally across said groove adjacent said transverse hole to aid in bending a portion of said stem extending through said transverse hole into said groove.

9. An interproximal brush as set forth in claim 8, wherein said boss is in the form of a frustrum.

10. An interproximal brush as set forth in claim 9, wherein said brush retaining end portion is bent upwardly at an angle of from about 5° to about 25° with respect to the longitudinal axis of said handle.

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