Interdental Cleaning on a Scientific Foundation

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It is a well-known fact that good oral hygiene is essential to maintaining oral health. The two most common oral diseases, caries and periodontal disease, are predominantly interdental diseases, since the interdental area is where plaque preferably accumulates and also an area that cannot be reached with a toothbrush. Therefore, interdental cleaning in adjunct to toothbrushing are cornerstones in achieving plaque control in daily oral home care.

Prevention of periodontal disease

Periodontal disease is common worldwide. Periodontitis affects approximately 50% of the adult population and severe periodontitis prevalence varies from 10 to 15%; prevalence figures are positively associated with increasing age (Chapple et al. 2015, Petersen and Ogawa 2012, Eke et al. 2015). There are several risk factors for the development of periodontitis. The most important is the accumulation of a plaque biofilm along and below the gingival margin. Control of and removal of this biofilm is of utmost importance to maintaining oral health.

High quality oral hygiene is needed to both prevent the development of periodontal disease and as a part of the treatment of periodontal disease, and also, to prevent a recurrence of periodontitis and further bone loss.

It has been shown that a manual toothbrush used alone on average reduces plaque scores by 42% (Slot et al. 2012) and will not reach the interdental surfaces (Van der Weijden and Slot 2011). Consequently, an additional interdental cleaning device is always needed.

Several such tools are available on the market; i.e., floss, toothpicks and interdental brushes. There is not one single interdental cleaning device which suits all patients and interdental spaces; therefore, the choice recommended for a specific patient needs to be based on clinical experience and scientific knowledge.

The interdental brush

According to ISO (ISO 16409:2006), an interdental brush is a hand-powered device composed of filaments emanating radially from a stem, intended for the cleaning of interdental surfaces. The stem is the central support structure, usually composed of a twisted wire, which secures the filaments. A filament is defined as a single strand, attached to the stem. The brush head is the portion that passes in and out interdentally. The brush head can be fixed, or removable though fixed during use. The handle is the part of the interdental brush that holds the stem.

Several studies have compared interdental brushes and other interdental cleaning devices, especially floss, in respect to their influence on plaque and gingivitis. Patient preference is also a factor that has been evaluated. The research in favour of interdental brushes is convincing.
Scientific support for interdental brushes

Already in 1970, interdental brushes, toothpicks, and dental floss were compared in respect to plaque reduction in wide-open embrasures (Gjermo and Flötra 1970). The interdental brush was reported to be the preferable device for plaque removal in this type of embrasures. This study also examined plaque reduction in a younger population with tighter embrasures, but the interdental brush was not offered as an alternative for this group, with the probable explanation that there were only larger sizes of interdental brushes available on the market at the time of the study.

A significant proportion of the research conducted to evaluate and or compare interdental cleaning devices is performed on subjects with embrasure type II or III (Nordland and Tarnow 1998).

Interdental brushes are shown to have a positive effect on parameters such as bleeding, plaque and pocket reduction. They are also superior to other manual interdental cleaning devices in subjects, who either suffered from periodontitis or were included in a maintenance program after periodontal treatment (Kiger et al. 1991, Christou et al. 1998, Jared et al. 2005, Jackson et al. 2006, Rösing et al. 2006).

In a systematic review based on nine articles, it was concluded that interdental brushes used as an adjunct to toothbrushing removed more plaque than just toothbrushing, and that dental floss and wood sticks are surpassed by interdental brushes in plaque removal. Furthermore, the review showed a positively significant difference in using interdental brushes with respect to plaque scores, bleeding scores, and probing pocket depth, compared to other interdental cleaning devices (Slot et al. 2008). The study population in most of these nine studies consisted of patients enrolled in a periodontal maintenance program.

In an examiner-blinded, randomized split-mouth clinical trial, interdental brushes were shown to significantly reduce bleeding sites in subjects with Type I embrasures (Imai and Hatzimanolakis 2011). In addition, a systematic review concluded that interdental brushes are an effective alternative to dental floss for reducing interproximal bleeding and plaque, also in subjects with Type I embrasures (Imai et al. 2012).

A meta-review concluded that there is consistent evidence for interdental brushes being the most effective devices for interdental plaque removal (Sälzer et al. 2015). This is also stated in the report of the 11th European Workshop in Periodontology on primary prevention of periodontitis (Chapple et al. 2015). According to the working group, interdental brushes are the preferred choice for interdental cleaning. Floss can be an alternative only when sites are too narrow for the interdental brush and show gingival and periodontal health.

From the presented articles, it appears that interdental brushes, when compared with other manual cleaning devices, have the highest efficacy in plaque removal and on periodontal parameters. All recommendations regarding interdental cleaning devices need to be tailored; the sizes and shapes of the interdental spaces have to be considered. An individual who has been recommended to use interdental brushes needs to be instructed regarding the appropriate size or sizes, and also on an appropriate technique (Claydon 2008).

Cylindrical and conical interdental brushes

Cylindrically and conically shaped interdental brushes are the two most common designs of interdental brushes. The effectiveness with respect to plaque and bleeding scores of these two designs has been compared in a randomized controlled clinical study (Larsen et al. 2016). A statistically significant difference was shown in plaque and bleeding scores at lingual approximal sites, disto-lingual and mesio-lingual sites, due to an increase in plaque and bleeding scores at these sites during the test period in the group allocated to the conical interdental brushes. The authors declare the results as being dependent on the geometric differences in the shape of conical and cylindrical interdental brushes, in favour of the cylindrical shape.
Patient compliance – the key to success

Interdental brushes and dental floss have been compared from a patient preference perspective, in favour of the interdental brush (Wolife 1976, Christou et al. 1998, Noorlin and Watts 2007, Imai and Hatzimanolakis 2010, Chapple et al. 2015). Studies have shown that most patients preferred the interdental brush over floss, that they felt the interdental brush to be both more efficient and easier to use, and that they were more willing to use the interdental brush. These factors may all contribute to enhancing the individual’s oral self-care compliance.

To achieve adequate oral hygiene, guiding the patient in regard to choosing the correct interdental brush size/sizes is of utmost importance; all interdental space varieties in the individual need to be considered. A slight resistance felt on insertion implies the correct size. Professional instruction on appropriate use is essential to obtain the optimal effect. Motivating the patient is the key to long-term compliance.

Conclusion

The significance of good oral hygiene in order to prevent oral disease is indisputable. Evaluating individual needs and conditions and weighing them together with scientific support should be the basis for instructions and recommendations, thus creating the best possible foundation for patient compliance and long-lasting oral health.
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