

## Analytical Study of the Operator/Patient's Comfort during the Use of Three Specific Interdental Flosses in Fixed Prosthesis

Sanavia C<sup>1\*</sup>, Iommiello AM<sup>2</sup>, Jimenez M<sup>3</sup>, Zunino P<sup>4</sup> and Pera P<sup>5</sup>

<sup>1</sup>Professor at University of Genoa, Professor at University la Sapienza, Rome, Italy

<sup>2</sup>First level Master at University la Sapienza, Rome, Clinical tutor at University of Genoa, Italy

<sup>3</sup>Dental hygienist, DH, Italy

<sup>4</sup>Technical Coordinator Department of Surgical and Diagnostic Sciences Integrated (DISC) at University of Genoa, Italy

<sup>5</sup>Director of the Dental School in Genoa, Professor at University of Genoa, Italy

This article was published in the following Scient Open Access Journal:

Journal of Dental and Oral Health

Received August 27, 2015; Accepted September 11, 2015; Published September 28, 2015

### Abstract

The objective of the study is to evaluate the comfort and adaptability of 3 types of specific dental flosses in the hygienic procedures of the dental spaces in fixed prosthesis.

The study is based on comfort and adaptability (intended to ease of use) and how the specific floss adapts to the interdental spaces through the use of questionnaires that permitted to make assessments from operators and patients.

### Introduction

The American Dental Association (ADA) recommends flossing one to two times daily. In case of patient with a fixed prosthesis the use of the toothbrush as the only aid in home care will not give a complete and accurate cleansing. The design of the prosthesis may limit access of the toothbrush in some areas. This raises the need to use another tool to ensure correct hygiene of the fixed prostheses. The use of the floss in combination with the toothbrush contributes to gingival health allowing removal of plaque, preventing gum disease; alitosis and tooth decay (that may afflict roots exposed), ensuring the conservation of support devices of the prosthesis in the oral cable [1,2]. To this purpose the use of new forms of dental floss is particularly promising [3]. Latest generation spongy flosses are preferred because they are made of multi-filaments twisted together in order to allow the effective removal of biofilm [4]. Biofilm is a group of microorganisms stick to each other on a surface in a self-produced matrix [5], so it is important to remove it mechanically with the help a floss which can reach difficult areas. This type of flosses can also be imbibed with fluorides (0,2% NaF), antimicrobial gels or mouthwashes increasing the efficacy in remineralisation and control of biofilm [6].

### Materials and Methods

For this analytic study it has been chosen three characteristic types of dental floss for fixed prosthesis. X-Floss (code 1) with a thick and bulky structure with a grommet nylon stable; Oral-B Super Floss (code 2) equipped with a segment drive, a section of sponge and normal floss and Curaprox Floss Bridge & Implant (DF 844-code 3) consists due ends rigid with the function grommet nylon and a central section of spongy floss.

Criteria in this study was to expected that the patient present with a minimum of four interdental spaces, for a more significant test for the different types of floss and that these spaces are located preferably in posterior sectors because they are more difficult to clean with dental floss. This study included 37 patients and 288 interdental spaces were examined. The type of fixed prosthesis examined: natural teeth (type A), on implants (type B), mixed (type C), prosthesis Toronto (type D). Two questionnaires were assigned to 37 patients; one to the operator for the evaluation of the efficiency and adaptability of the specific floss and one to the patient who is not trained to the use of dental floss as home care aid. For the study sealed envelopes containing the floss of the same type were prepared. The patient then chose one envelope at random; therefore neither the patient nor the operator had knowledge of the type of floss to be used until opening of the envelope (Figure 1).

For the evaluation of comfort and adaptability a technique that involved the

\*Corresponding author: Sanavia C, Dental hygienist, DH, Professor at University of Genoa, Professor at University la Sapienza, Rome, Italy, Tel: 3884499162, Email: consuelo.sanavia@gmail.com



Figure 1: The types of fixed prosthesis examined are type A, type B, type C & type D.

insertion of the specific floss in the interdental spaces with the rigid part (threader) was demonstrated. Continued by sliding 'back and forth' repeatedly until the complete cleaning of the interdental areas. Followed by the removal of the specific floss is pulled from one side. After the demonstration of technique, the operator completed the assigned table. The patient not accustomed to the use of floss has flossed and compiled in turn his own table. The demonstration of technique has been realized following the tell-show-do method [7].

The evaluation was performed using the Likert scale [8] of measurement: a scale consisting of a list of statements (items) that are linked to the attitudes on which you want to investigate (comfort and adaptability of the specific flosses), along with five possible answers (choices) for all assigned and label: completely agree = 5, agree = 4, uncertain = 3, disagree = 2, and completely disagree = 1.

### Evaluation Criteria

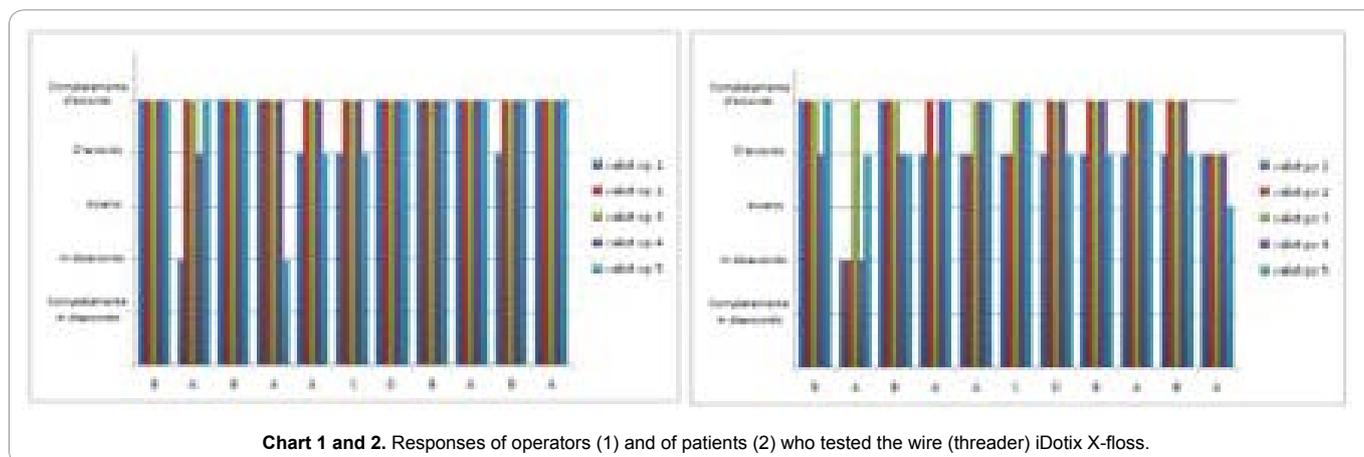
	Completely agree	Agree	Uncertain	Disagree	Completely disagree
<b>1. The insertion of the inter-dental floss was easy to insert.</b>	5 = 100% The floss was inserted easily in <b>100%</b> of interdental spaces	4 = 80% The floss was inserted easily in <b>80%</b> of the interdental spaces	3 = 50% The floss was inserted easily in <b>50%</b> of the interdental spaces	2 = 20% The floss was inserted easily in <b>20%</b> of the interdental spaces	1 = 0% The floss wasn't inserted at all
<b>2. The hard segment (threader) bent.</b>	1 = 0% The rigid segment bent so I can't use the floss in any interdental space	2 = 20% The rigid segment bent but I can use the floss in <b>20%</b> of interdental spaces	3 = 50% The rigid segment bent but I can use the floss in <b>50%</b> of interdental spaces	4 = 80% The rigid segment bent but I can use the floss in <b>80%</b> of interdental spaces	5 = 100% The rigid segment didn't bend and I can use the floss in <b>100%</b> of interdental spaces
<b>3. The removal of the floss was easy.</b>	5 = 100% The removal of the floss was easy in <b>100%</b> of interdental spaces	4 = 80% The removal of the floss was easy in <b>80%</b> of interdental spaces	3 = 50% The removal of the floss was easy in <b>50%</b> of interdental spaces	2 = 20% The removal of the floss was easy in <b>20%</b> of interdental spaces	1 = 0% I couldn't remove the floss
<b>4. The floss is passed in all interdental spaces</b>	5 = 100% The floss is passed in <b>100%</b> of interdental spaces	4 = 80% The floss is passed in <b>80%</b> of interdental spaces	3 = 50% The floss is passed in <b>50%</b> of interdental spaces	2 = 20% The floss is passed in <b>20%</b> of interdental spaces	1 = 0% The floss did not pass through the interdental spaces
<b>5. The floss is adapted in the inter-dental spaces</b>	5 = 100% The floss adapted in <b>100%</b> of interdental spaces	4 = 80% The floss adapted in <b>80%</b> of interdental spaces	3 = 50% The floss adapted in <b>50%</b> of interdental spaces	2 = 20% The floss adapted in <b>20%</b> of interdental spaces	1 = 0% The floss did not adapt in the interdental spaces
<b>6. Had pain or Sensitivity</b>	1 = 100% Had Pain or Sensitivity in interdental spaces	2 = 80% Had Pain or Sensitivity In <b>80%</b> of Interdental spaces	3 = 50% Had pain or Sensitivity in <b>50%</b> of Interdental spaces	4 = 20% Had Pain or Sensitivity in <b>20%</b> of Interdental spaces	5 = 0% Never had Pain or Sensitivity in Inter-Interdental spaces

### Results

Results of flossing with the X-Floss by iDontix 13 patients were evaluated; 6 on natural teeth with fixed prostheses, 3 with fixed prostheses on implants, 2 mixed (fixed prosthesis, fixed prosthesis on implants), and 2 Toronto type prosthesis, for a total of 98 interdental spaces.

The insertion of the floss was easy for all 13 patients. The hard segment (threader) never folded for 11 patients and 2 only slightly. The floss was easy to remove for 9 of the patients that completely agreed and 4 agreed. The floss passed through all the interdental spaces; 11 patients completely agreed and 2 agreed. All patients completely agreed on the adaptability of the wire (threader) in all interdental spaces. In regards to the perception of pain or sensitivity 9 patients had no pain or sensitivity and 4 did have minimal pain or sensitivity (Chart 1 and 2).

Results of flossing with the Oral-B Superfloss by Procter and Gamble 12 patients were evaluated; 2 in fixed prostheses on



natural teeth, 1 in fixed prostheses on implants, 7 mixed (fixed prosthesis, fixed prosthesis on implants), and 2 Toronto type prosthesis, for a total of 92 interdental spaces (Figure 2).

The insertion of floss was easy for 9 patients that completely agreed and 3 agreed. The hard segment (threader) never bent; 6 patients were in complete agreement, 6 disagreed. The floss was easy to remove for all 12 patients who completely agreed. The floss passed through all interdental spaces 7 patients completely agreed, 3 agreed, and 2 disagreed. The floss proved adaptable to all interdental spaces for 7 patients completely agreed, 5 agreed. In regards to the perception of pain or sensitivity 10 patients had no pain or sensitivity, 1 minimal pain or sensitivity, and 1 did have

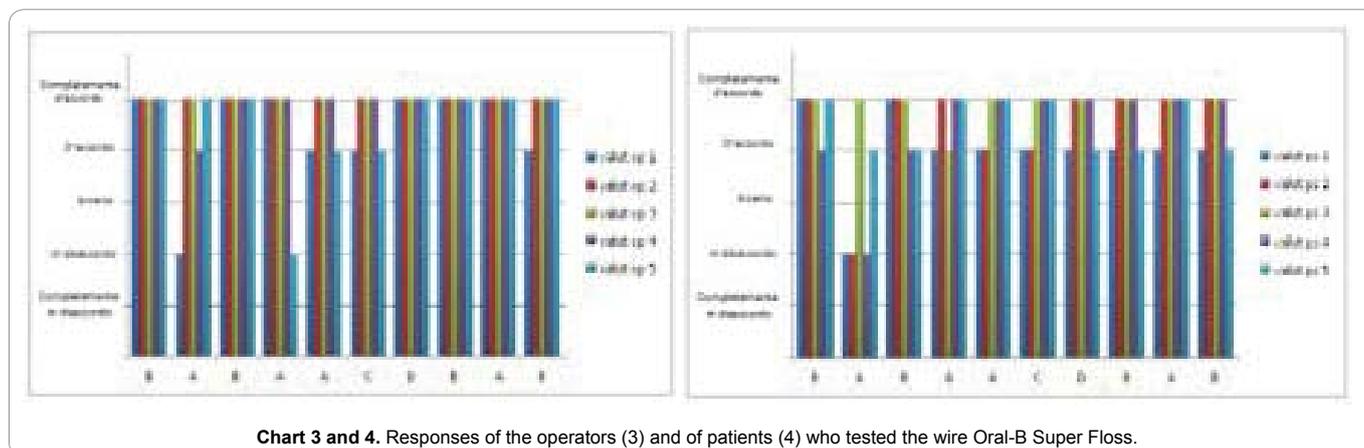
some pain or sensitivity (Chart 3 and 4).

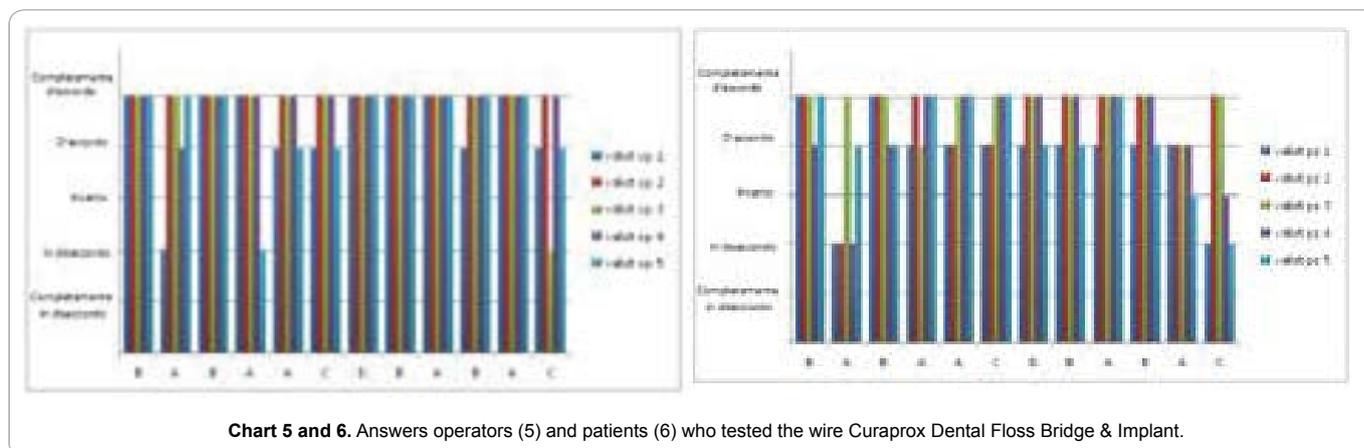
Results of flossing with the Curaprox Dental Floss Bridge & Implant (DF 844) 12 patients were evaluated; 5 on natural teeth with fixed prostheses, 4 with fixed prostheses on implants, 2 mixed (fixed prosthesis, fixed prosthesis on implants), and 1 Toronto type prosthesis, for a total of 98 interdental spaces.

The insertion of the floss was easy for 2 patients who completely agreed, 8 agreed, and 2 disagreed. The hard segment (threader) never bent; 1 patient completely agreed, 3 agreed, and 1 disagreed. For the ease of removal of the floss; 10 patients completely agreed and 2 agreed.



**Figure 2:** X-floss in fixed prosthesis.





The floss passed through all the interdental spaces; 7 patients completely agreed, 3 agreed, 1 disagreed and 1 patient was uncertain. The floss proved adaptable to all interdental spaces; 8 patients completely agreed, 3 agreed, and 1 disagreed. In regards to the perception of pain or sensitivity 5 patients had no pain or sensitivity, 5 minimal pain or sensitive, 1 patient was uncertain, and 1 did have some pain or sensitivity (Chart 5 and 6).

(DF 844 "Bridge & Implant".

## Discussion

It was found that research showed no difference statistically significant between the three types of interdental floss from the results and comments of the clinicians and the patients in regards to comfort and adaptability. All three interdental flosses met the search criteria. In regards to iDontix X-Floss 92.3% of the clinicians were completely satisfied and 76.9% of patients were completely satisfied with the performance of the floss.

Oral-B Superfloss 76.6% of the clinicians were are completely satisfied and 55.5% of patients were completely satisfied with the performance of the floss.

Finally, Curaprox Dental Floss Bridge & Implant (DF 844) 81.6% of the clinicians were completely satisfied and 53.3% of patients were completely satisfied with the performance of the floss.

## Comments

iDontix X-Floss, although it can stretch to become thin, was found more difficult to use for fixed prostheses on natural teeth, where typically the patient's had tight spaces.

The clinicians noted that the wire (threader) on the Oral-B Superfloss needed the support of tweezers occasionally because the hard segment tends to bend when it gets wet. For the patient, if the prosthesis was composed of many interdental spaces the hard segment (threader) of the Oral-B Superfloss, did not hold and did bend. It was favored in types of prostheses that have fewer interdental spaces or where the interdental spaces are tight.

## Conclusions

Evaluating the percentages of satisfactory answers, it is concluded that all three of the interdental flosses met the search criteria. The iDontix Floss was found more satisfactory in terms of ease of use, facilitated by the thin thread guide and the adaptability of the floss, exceeding expectations of comfort by clinicians and patients. Considering the results, it can be concluded that all three interdental flosses thanks to their quality characteristics, were effective and comfortable for patients to ensure daily cleansing of fixed prostheses on implants and natural teeth.

## Conflicts of Interest

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial or non financial interest in the subject matter or materials discussed in this manuscript.

## References

- Berchier CE, Slot DE, Haps S, Van der Weijden GA. The efficacy of dental floss in addition to a toothbrush on plaque and parameters of gingival inflammation: a systematic review. *Int J Dent Hyg.* 2008;6(4):265-279.
- Terezhalmay GT, Bsoul SA, Bartizek RD, Biesbrock AR. Plaque removal efficacy of a prototype manual toothbrush versus an ADA reference manual toothbrush with and without dental floss. *J Contemp Dent Pract.* 2005;6(3):1-13.
- A. Genovesi, A. Barone, C. Lorenzi, C. Sanavia. Sperimentazione sul controllo della placca negli spazi interprossimali con l'utilizzo del filo interdentale. *Rivista Italiana Igiene Dentale.* 2006;(1):11-15.
- A. Genovesi, C. Sanavia, O. Marchisio, C. Lorenzi, L. Giacomelli, F. Bisacchi, M. Ricci, G.M. Nardi, SISIO Working Group. Protocolli di igiene orale domiciliare. Indicazioni della letteratura Prevenzione & Assistenza Dentale, 2010;36(1):17-23.
- "Terminology for biorelated polymers and applications (IUPAC Recommendations 2012)". *Pure and Applied Chemistry* 84 (2): 377-410. 2012.
- Sarner B, Birkhed D, Huysmans MC, Ruben JL, Fidler V, Lingstrom P. Effect of fluoridated toothpicks and dental flosses on enamel and dentine and on plaque composition in situ. *Caries Res.* 2005;39(1):52-59.
- Sharath A, Rekka P, Muthu MS, Rathna Prabhu V, Sivakumar N. Children's behavior pattern and behavior management techniques used in a structured postgraduate dental program. *J Indian Soc Pedod Dent.* 2009;27(1):22-26.
- Likert R. Technique for the measure of attitudes. *Arch Psycho.*1932;22:140.