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Throughout the pregnancy, women are more prone to periodontal inflammations, changes in the subgingival bacterial flora, and a diminished immune response to periodontal inflammation - all due to a rise in oestrogen and progesterone levels.

Often, the oral hygiene routine practiced at home before the pregnancy was already not adequate for proper control of bacterial plaque. It often only consists of using a toothbrush. As the pregnancy progresses, we observe in our clinical practice an increase in gingival inflammation aggravated by hormonal changes. Often in combination with a worsening oral hygiene routine. The reasons for this may be the nausea and vomiting; as well as a tendency to avoid brushing the gum line to prevent gum bleeding. Another problem that should not be underestimated, as mentioned above, is the belief that bleeding gums is a normal condition during pregnancy - along with the appearance of post-partum caries. This belief is the reason why the presence of a serious problem in progress does not set off any alarm bells, while it should be treated to avoid potential problems for both the child and the mother.

In 2010, a case of fetal death was reported that was caused by the bacterium *Fusobacterium nucleatum* - which originated in the mother's mouth. The mother with gravidic gingivitis suffered from respiratory inflammation and, after a few days, the fetus died in the uterus.

Fusobacterium nucleatum was isolated from the placenta and fetus for further study. By examining the bacterial flora of the mother, the same strain was found in the bacterial subgingival plaque, but it was absent in the supragingival bacterial flora, rectum and vagina.

More studies show a link between bacteria present in the oral cavity and problems occurring during the pregnancy; including premature birth and preeclampsia. The pathogenic bacteria exclusively found in the oral cavity in the presence of an inflammatory state of the periodontium that are related to these problems are, for example, *Fusobacterium nucleatum*, *Porphyromonas gingivalis*, *Filifactor alocis* and *Campylobacter rectus*. *

The pregnancy can therefore be considered a particularly risky time for both the mother's oral health as well as for the fetus - and the future child health.

Can a personalized treatment plan consisting of more information, education, motivation and monitoring help in controlling the phenomenon of gingivitis gravidarum and its possible consequences?

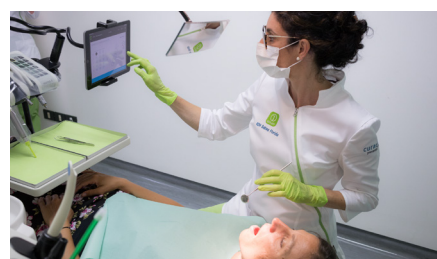
Since 2018, I have been using an application to monitor and motivate patients. The BOB app is an application especially developed for use by the dental hygienist or dentist during the oral hygiene treatment. Within the application, a mouth map is created - where missing teeth, crowns and implants are highlighted.

The BOB app for oral health monitoring during pregnancy

For the dental hygienist, the deep-rooted belief of patients that gums are by definition inflamed during the pregnancy is inherently difficult to fight. The importance of proper oral hygiene is still often underestimated, even by dentists, gynaecologists and other doctors. At the same time, periodontal inflammations have been linked to premature birth, low birth weight and transmission of cariogenic bacteria from mother to child - which increases the risk of carious lesions in the child.

The mouth map shows the recommended size of interdental brushes or other aids to be used for each inter-proximal space, and the detection of inter-proximal inflammation using the Bleeding On Interdental Brushing Index (BOIB) - from which the application derives its name. The most suitable interdental brush size is determined by the use of a color code probe, each corresponding to a specific size. After identifying one or more brush sizes, we proceed with the detection of the BO(i)B bleeding index. First the interdental brush is inserted in the inter-proximal space. After completing a sextant 30 seconds should be attended before entering data related to bleeding in the app.

After compiling all the data, the app will ask to take a photo. Finally, the application comes up with an inter-proximal inflammation index, called the BOB score. The patient score is ranked in one of four inflammation categories and is displayed together with the photo in a graphic for an overall view - along with the generated mouth map showing the recommended interdental brushes and inflamed inter-proximal spaces. Everything is sent to the patient by email, offering them continuous motivational support - also at home.



Case Study

I am happy to share my experience with a pregnant patient, whom I followed from the sixteenth week of pregnancy until the end of her pregnancy.

A 38-year-old woman, three months pregnant, presents herself in the practice. During her previous pregnancy, the patient experienced gravid gingivitis. However, convinced of the normality of this phenomenon, she did not follow any instructions or advice I provided her with. This time, the patient is more predisposed to receiving such information as she has now been diagnosed with arthritis as well. She tells me that she has already begun to notice an increase in gingival inflammation. After the clinical examination, an acceptable control of bacterial plaque as obtained with the toothbrush was observed - unlike the inter-proximal spaces, which showed signs of inflammation. The patient occasionally uses dental floss which, due to her anatomical widths of the inter-proximal spaces, is an inadequate aid. I decide to use the BOB application to motivate the patient to use an interdental brush instead and, at the same time, allow us to monitor inflammation throughout her entire pregnancy.



P1 BOB-Score



NO INFLAMMATION

0% Bleeding / Inflammation



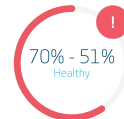
MILD INFLAMMATION

1% - 29% Bleeding / Inflammation



MODERATE INFLAMMATION

30% - 49% Bleeding / Inflammation



SEVERE INFLAMMATION

50% - 100% Bleeding / Inflammation



First appointment - 16 weeks of pregnancy

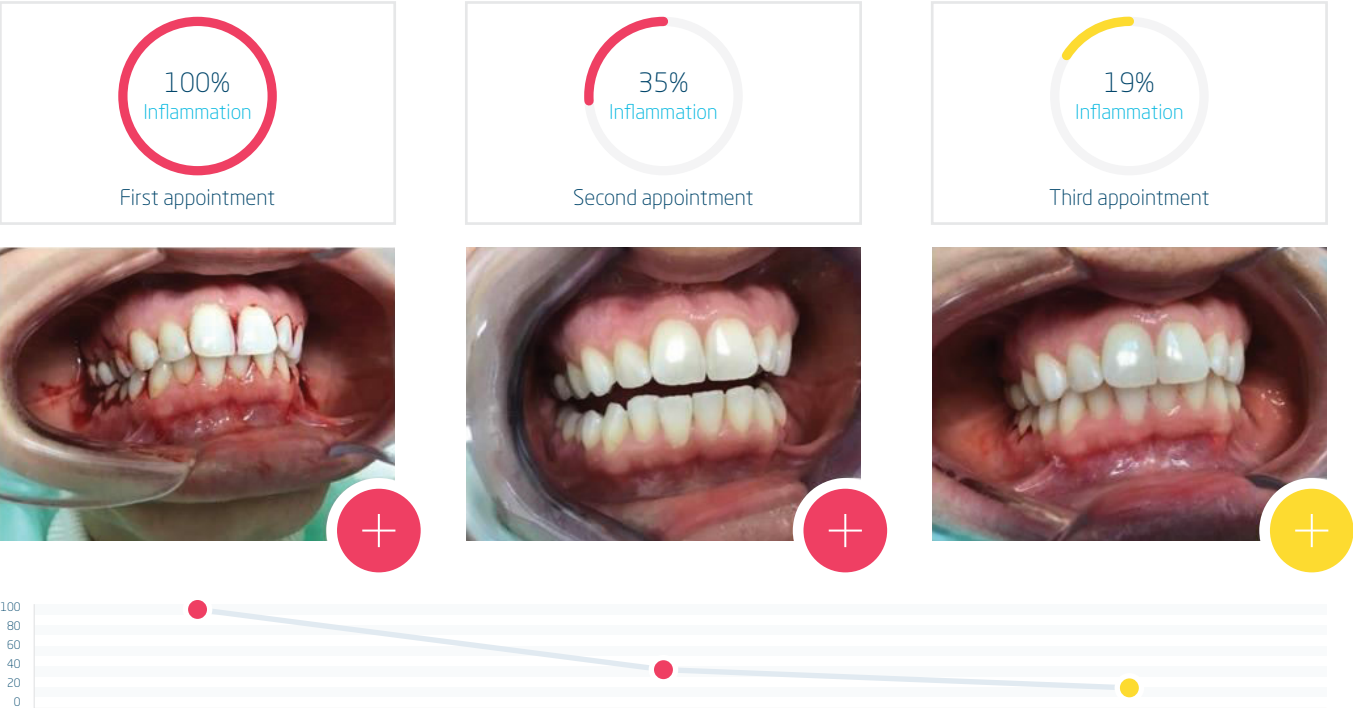


The first BOB score showed 100% inflammation of the inter-proximal spaces, which corresponds to severe inflammation. After instructing the patient on how to use the Curaprox Prime 06 and 09 brushes, I recommended Be You toothpaste which, in addition to 950ppm fluoride and hydroxyapatite, also contains various beneficial properties for the gums and mucosa. The patient returned to the practice after 11 days.

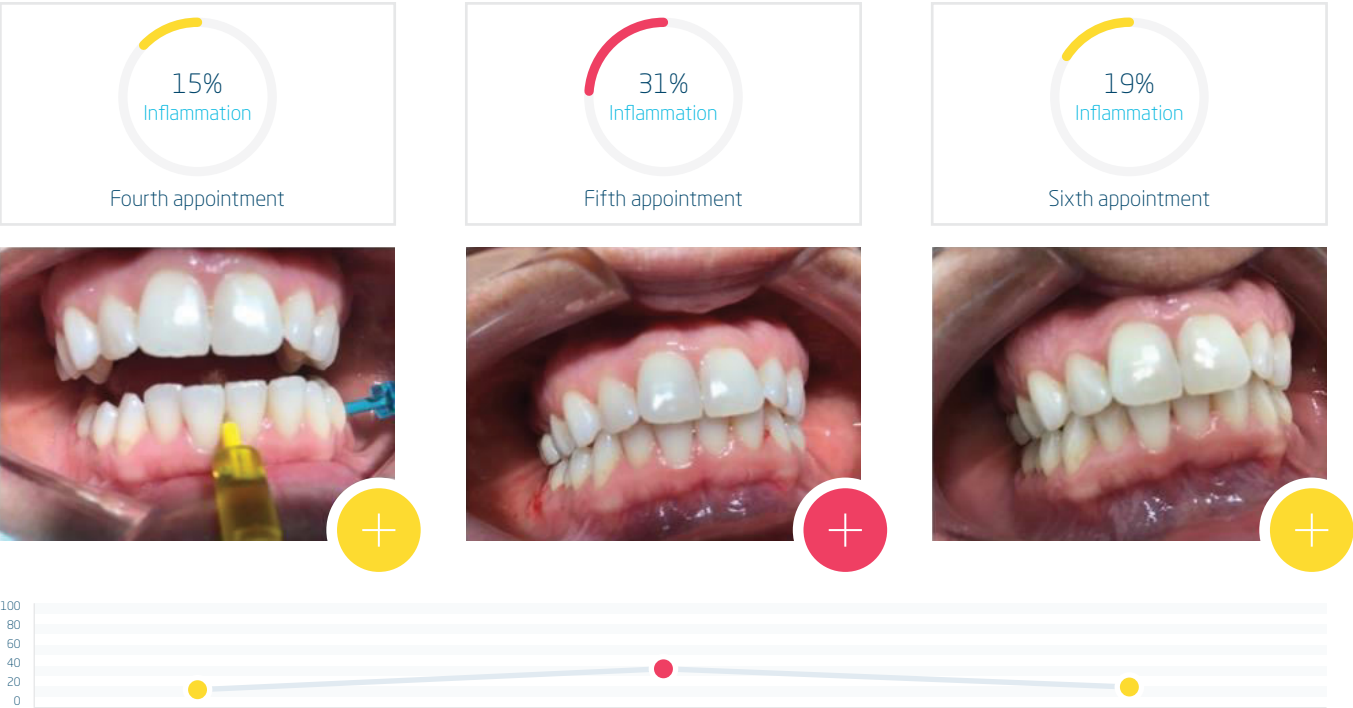
Sixth appointment - 35+1 weeks of pregnancy



She shared with me that she had noticed less bleeding. In fact, the BOB score was now determined to be 35%. A good result in a short period of time. I complimented the patient on her commitment in using the interdental brushes, after which we reviewed her brushing technique. At the third session, after 14 days, there was a further improvement in inter-proximal inflammation. The BOB score was now determined to be 19%. The patient told me that she was very happy. She did not believe that it was possible to have so little inflammation during pregnancy.



After the third appointment, I saw the patient three more times. The second-last BOB score showed a slight increase in inflammation. The patient was diagnosed with severe iron deficiency, for which she started taking a supplement as prescribed by her gynaecologist. I recommended a gel containing 0.5% chlorhexidine and hyaluronic acid (Perio Plus Focus gel) to be applied on the interdental brush for specific local use, to help calm down the inflammation. I assured the patient to continue using the interdental brush as she was doing.



At the last BOB score appointment, a few days before delivery, the patient returned to 19% of inter-proximal inflammation. This corresponds with mild inflammation - the patient did a good job of maintaining consistency in the use of the interdental brush. As a dental hygienist, I was very satisfied with the treatment strategy and final result. The patient thanked me several times for the personalized treatment that I offered and told me that she will never stop using the interdental brush.

P1 - Dental Folder

The BOB-Score mouth map (of the third appointment) indicate the interdental brush sizes and present the inflammation for each interdental space.

