MASTEROPPGAVE

Replacement of a single missing tooth in maxilla - factors to consider

Kyrre Aas Hustad
Karoline Sørensen
Vegard Haug Skogekker
Katrine Horn Skogen

Veileder:
Ulf Örtengren

UNIVERSITETET I TROMSØ
Det helsevitenskapelige fakultet
Institutt for klinisk odontologi

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ABSTRACT

Background: In dentistry when replacing a single missing tooth in the maxilla, the choice of treatment is often between either a fixed partial denture (FPD) or a single dental implant. The challenge is to utilize relevant factors in treatment planning, achieving benefit for the patient. This article focuses on the factors that should be taken into consideration in decision-making. The investigation provides an attempted to further understand the importance of the factors studied. Method: A questionnaire was sent out all members of the Norwegian Society for Prosthetic Dentistry (119). Result: There was a difference in importance of the factors studied when treatment was planned with either a single dental implant or a FPD concerning replacement of a missing tooth in the maxilla. The factors of bisphosphonates, smoking, oral hygiene, periodontitis, bruxism and diabetes all seemed to be of more importance when placing a dental implant compared to a conventional FPD. Conclusion: The final choice between a dental implant and a FPD depended on several factors that affected the decision-making; among these were cost and patients' awareness of the different treatment options.

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1.0 Introduction

In dentistry when replacing a single missing tooth, the choice of treatment is often between either a fixed partial denture (FPD) or a single dental implant. FPD is a well-known therapy for dentists in general, and has been used for several years. The success rate can also be considered as high, with a longevity for a majority of the constructions for over 15 yrs (1). During the last 2 decades implants has gained much popularity as a treatment option, and the number of different types of implant systems and manufacturers have increased (2,3). Today there are over hundred manufacturers on the marked (4). The treatment with implants, is today extensive, and it has been calculated that approximately 10-15000 implants are placed every year on patients, only in Norway (5).

Dental implant is the solution that seems to be most prone into media, and it is advertised as the most modern treatment modality on the marked. Today patients are also more aware of dental implants as a treatment option. Still the critical question will, however, be; if patients do want an implant, is it always possible to meet their expectations regarding function and aesthetics? (6).
Hence it is crucial that dental practitioners and dental students are aware of the possibilities and limitations of treatment with dental implants, and be able to compare implant treatment with more conventional prosthodontic treatment, such as FPDs. Thus they can be able to describe and give adequate information to the patients, when presenting the different treatment options.

Today patients with low bone density (e.g. osteoporosis) often use bisphosphonates (6). Such medication has been questioned since it may induce osteonecrosis (7). Consequently it's important to be aware of this type of adverse effect, and to what extend this medication can be a contraindication for placing a dental implant (8).

Smoking is a contributing factor for periodontitis, which can lead to attachment loss or in the worst-case tooth loss, which is unbeneficial in FPD treatment. (9). Smoking also increases the risk for peri-implantitis (10). Studies have been made regarding risk of implant failure and smoking (11,12,13,14). The risk of dental implant failure has been calculated as doubled in smokers compared to non-smokers (15). Some studies show a significant relationship between smokers and implant failure, but in the search for literature in the present study, only one of the articles was evidence based (12). Since there is little concrete evidence

regarding the risk for implant failure in smokers, it seems interesting to evaluate if this factor is considered as important in treatment planning. Even though the percentage of people that smoke has decreased, still 19% of the Norwegian population smokes daily (7).

According to F. Lobbezoo et al bruxism is defined as "*a movement disorder of the masticatory system that is characterized, among others, by teeth grinding and clenching, during sleep as well as during wakefulness´´* (16). Despite the fact that it appears to be little evidence in the literature of bruxism being a contraindication for placing implants, it seems to be an understanding among different authors that a cautious approach is recommended (17,18,19). Hence oral Parafunctional activity is still a highly relevant factor and should be carefully assessed in conjugation with treatment planning.

Patients with diabetes mellitus seem to have an increased risk for tooth loss/ implant loss compared to non-diabetic patients (20). This is one the most common systematic diseases, and patients in this situation have a greater need for complex dental treatment (21,22). The amount of studies showing evidence based contraindication for implant placement in diabetic patients are very limited (23). Some articles have, however, shown a tendency of higher implant failure and infections (21,24). For FPDs', it must be taken into consideration that patients with diabetes are often associated with gingivitis, periodontitis, salivary dysfunction and caries(25). These manifestations are important factors regarding prosthodontics.

Aesthetics is one of the primary challenges when replacing a missing tooth, especially anterior in the maxilla, where factors like gingival contour, lip line and smile line have to be taken into consideration (26,27). Because of patients awareness and increasingly demands for the final result to be like pre-existing anatomy (28), this could represent a challenge in treatment planning.

Since different kind of factors have impact on the choice of treatment, this study has focused on two popular treatment options for replacing a single missing tooth in the maxilla; single dental implants and FPD. In a literature search regarding FPDs', no evidence-based articles of the factors mentioned were found.

The hypothesis of this study was that there was a difference in importance of the factors studied when treatment is planned with either a single dental implant or a FPD, concerning replacement of a missing tooth in the maxilla.

The aim of this study was to try to evaluate the importance of these factors, and see if any factors were more essential for the choice of treatment than others.
To answer the aim of this study, specialists in prosthodontics in Norway were asked to evaluate the different factors when the treatment choice was between placing a dental implant or a FPD.

2.0 Material and methods

2.1 Selection of study participants

All members (n=119) of the Norwegian Society for Prosthetic Dentistry were included in this study. In their education and occupation they have all dealt with the subject of the present study, and presumably gained both knowledge and experience regarding the matter.

2.2 Pilot study.

A pilot questionnaire was sent out to different specialists and equivalent at the Institute of Clinical Dentistry (IKO University of Tromsø), and at TkNN (The Public Dental Service Competence Centre of Northern Norway). By this approach the questionnaire, as well as the patient cases included, could be more optimized and clarified based on the given feedback.

2.3 The questionnaire

The final questionnaire (Appendix 1) was sent out by ordinary mail in the beginning of September 2012. One reminder was sent out after four weeks.

Part 1 of the questionnaire aimed to determine how the participants valued factors relevant for two types of treatments: FPD and a single implant. The questionnaire was divided into 4 main sections; anterior part of the maxilla, posterior part of the maxilla, a general section and a section regarding periodontitis. It was emphasized that the factor of bone level was adequate for both treatments, and that the factors given were to be considered in a preoperative manner. In other words the participants had to rate the factors regardless of the final treatment.

The questionnaire also contained a short explanatory text, with examples on how to fill out the questions. The different treatment factors that were included in the questionnaire have been accounted for in the introduction.
A table concerning patient cost was added to the questionnaire. The intention of this was to gain information on whether the financial aspect of the patient had any relevance to the choice of treatment made by the specialists.

Part 2 consisted of two separate patient cases where a single tooth was missing in either the anterior or posterior part of the maxilla. Each case was supplemented with clinical photos, relevant x-rays and a short anamnesis. The reason for adding the cases to the questionnaire was to assess if there was any inconsistency between the factors of importance answered in part 1, and the final choice of treatment made by the participants working on the cases. The participants were asked to make a treatment decision based on the available information and to give a short annotate. Caution was taken not to guide the participants in their choice of treatment.

2.3 Ethical aspects

All questionnaires were returned anonymous and the responders could therefore not be identified. None of the information provided in the patient cases could be directly or indirectly linked to a single person. Since no information about the responders or no authentic health information was used, no approval by The Regional Committee for Medical and Health Research Ethics was required.

3.0 Results

3.1 Responders and non-responders

The total response rate was 32,1 % after sending out the final questionnaire and one remainder. Out of 119, ten questionnaires came in return due to wrong addresses. One

response was blank and could not be used. Eleven questionnaires were therefore excluded from the total response calculation.
Some of the others were not completely answered but were still useful since only some or one question not was responded to. The results for each question in focus were therefore calculated from the actual response rate at that question.

3.2 Pathology and medications.

Diabetes
When considering treatment with a dental implant, approximately one-third of the participants (10/33) regarded diabetes as a very important factor. None of the participants (0/33) regarded diabetes as a very important factor when considering a fixed partial denture (FPD) as the treatment of choice. It is, however, worth paying attention to, for treatment with FPD, only four of the participants regarded this factor as not important at all.

Bisphosphonates
Overall the use of bisphosphonates was by far regarded as the most important medical factor to consider prior to treatment with a dental implant. Twenty-four out of thirty-one considered bisphosphonates as "very important" in relation to the mentioned treatment modality. However, regarding a FPD 17/32 considered this factor to be of less importance.

Cardiovascular disease
Seventeen out of thirty-one considered cardiovascular disease as an important factor for dental implant treatment, while just over one-third of the participants (7/33) considered this as an important factor prior to treatment with a FPD. Only a minority of the participants (Implant 5/31, FPD 4/33) considered this factor to be very important.

Endocarditis
Endocarditis was considered as a very important factor by 12/32 when the choice of treatment was with a dental implant. This was also an important factor regarding FPD treatment and nearly one out of four (8/34) answered that this was a very important factor.

Impaired general condition and mucous membrane diseases
Both factors were regarded as important for the mentioned treatment modalities. For impaired general conditions the number of responders that regarded the factor as important,

were 16/32 for a dental implant, and 19/ 33 for treatment with a FPD. For mucous membrane lesions 15/32 and 17/33 participants considered this as an important factor for dental implant treatment and for treatment with a FPD, respectively.

3.3 Oral hygiene

Oral hygiene was divided into the amount of plaque (PLA): < 29%, between 30-69 and >70%. The importance of oral hygiene increased with increasing amount of PLA for both treatment modalities (Figure 1.1).

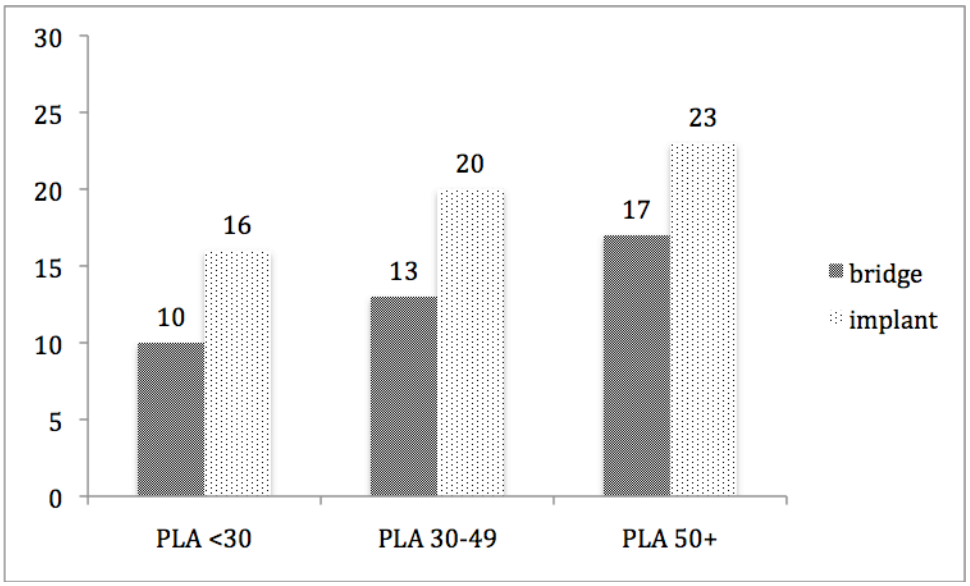

Figure 1.1 The relationship between amount of PLA and its importance for the responders in their choice of treatment.

3.4 Periodontal status

Periodontal status was in the questionnaire divided into 3 degrees of severity; mild, moderate and advanced periodontitis. More than half of the responders answered that mild periodontitis was an unimportant factor or less important factor, regardless of the treatment decision. Only 3/33 regarded mild periodontitis to be an important factor to consider before choosing the treatment modality.

If a patient had moderate or advanced periodontitis, the importance of the disease increased immensely. Moderate periodontitis was according to the participants an important/very important factor prior to treatment. Twenty out of thirty-three regarded moderate periodontitis as an important factor and 13/33 as a very important factor. All the participants (n=33) answered that advanced periodontitis was a very important factor to consider.

3.5 Economic considerations

Interestingly the responders were divided in two nearly equal parts concerning this question. Sixteen out of thirty-four answered that they often felt that the economic aspect of the patient was a limiting factor for choosing what they regarded as the best treatment modality, while 18/34 answered that they seldom felt that the patient's economy was a limiting factor. Twenty-four out of thirty-four answered that they never or seldom presented only one treatment alternative to the patient. Approximately one-third (10/34) responded that they often or always presented only the alternative that they consider is best for the patient.

3.6 Smoking

The question on smoking was in the questionnaire divided into; under ten (<10) and over ten (>10) smoked cigarettes per day. If a patient smoked, the responders regarded this as a more important factor to consider before treatment with a dental implant, than for a FPD. Twenty-four out of thirty-three regarded smoking as an important/very important factor prior to implant therapy if a patient smoked >10 cigarettes per day. Even if a patient smoked <10 cigarettes per day, smoking was still considered important by ≈ 80% of the responders. Smoking was generally not considered to be very important prior to FPD treatment. Only 10% of the participants considered smoking of >10 cigarettes per day to be very important prior to FPD treatment.

3.7 Endodontics and filled cavities.

The general part of the questionnaire included two questions regarding endodontics and two questions regarding filled cavities in planned pillars.

Endodontics

In the first question, the participants had to evaluate the importance of one or more planned pillars having previously gone through root canal treatment (RCT). Thirty-two out of thirty-four responders answered that this was an important or very important factor for treatment with an FPD. When considering implant treatment 20/28 answered that this was an important or very important factor.

If one distinguishes between the grading important or very important, considerably more participants answered that this was a <u>very important factor</u> concerning treatment with a FPD (18/34) *versus* treatment with a dental implant (11/28).

In the second question, the participants had to evaluate the importance of a neighbouring tooth with an apical radiolucency.
Approximately six out of seven responders (implant 26/30, FPD 29/34) answered that this was an important or very important factor, regardless of the treatment modality.

Filled cavities
In the first question, the participants had to evaluate the importance of planned pillars that had one previously filled cavity. Approximately half of the responders (implant 12/25, FPD 14/30) considered that as an important or very important factor.
In the second question, the responders had to evaluate the importance of planned pillars that had more than one previously filled cavity. Twenty-one out of twenty-nine answered that this factor was important or very important when considering treatment with an FPD. For treatment with a dental implant 15/24 regarded that as an important or very important factor. Also for this question, considerably more filled cavities were regarded as a very important factor for treatment with a FPD (12/29) *versus* treatment with a dental implant (6/24).

3.8 Aesthetics

The responders were asked to evaluate four separate aesthetic factors: lip line, smile line, gingival contour and arch shape. In general, the participants considered the anterior region as the most important region, regardless of the treatment modality.

Regarding both treatment modalities, very few (ranging from 3 to 6) of the participants considered the aesthetic factors to be very important in the posterior region. Except for arch shape. More than two-thirds of the participants considered arch shape to be very important when considering dental implants in the posterior region.

For the anterior region, almost all of the participants regarded lip line, smile line and gingival contour to be important or very important factors in relation to treatment with a FPD or a dental implant. Smile line was regarded as the most important factor regarding a FPD, but in the case of a dental implant all of the mentioned factors seemed to be equally important.

3.9 Age

Regarding age and treatment with a FPD, more than half of the participants considered age as a less important or unimportant factor, with decreasing importance with increasing age.

Prior to implant treatment, the participants considered the age group of 0-29 yrs as very important (Figure 1.2). For the other age groups (30-69, >79) the results were more similar to FPD treatment (Figure 1.3).

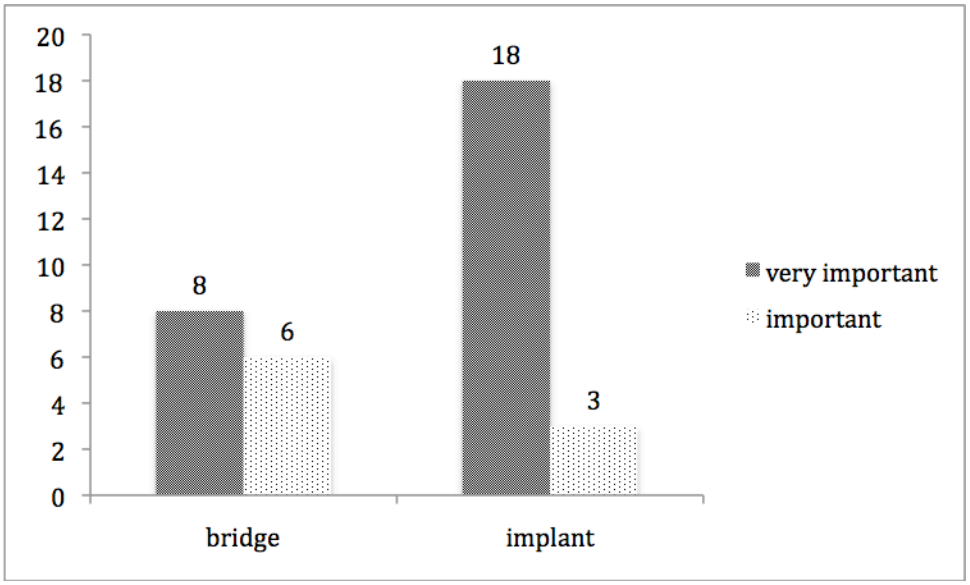

Figure 1.2 The relationship between the age group 0-29 years, and its importance for the responders in their choice of treatment.

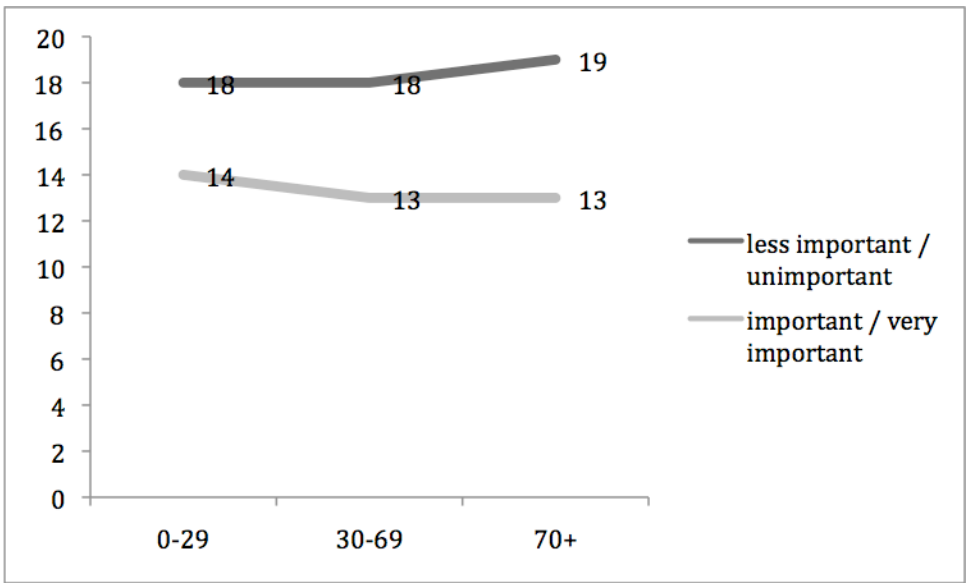

Figure 1.3 The relationship between age of the patients and its importance for treatment with an FPD.

3.10 Occlusion, bruxism and tooth clenching

Occlusion, bruxism and tooth clenching were all regarded essential by the participants. The posterior region and the anterior region were regarded to be of nearly the same importance, regardless of the treatment option (Figure 1.4).

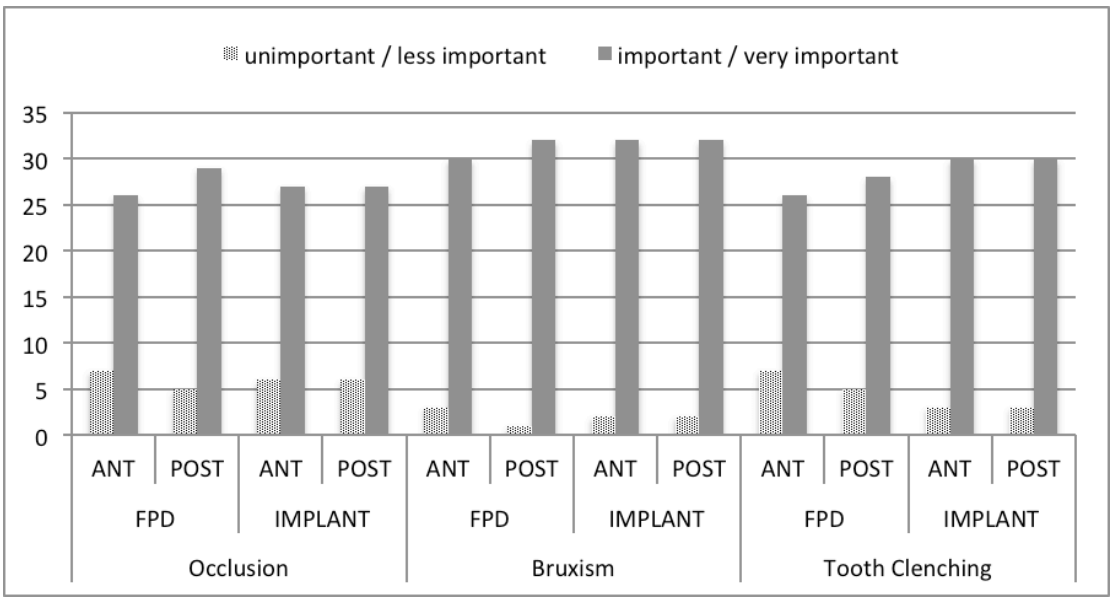

Figure 1.4 The relationship between the different para-functions and their importance in the choice of treatment.

3.11 Comparison of the different parts in the in questionnaire

For the majority of the responders, the results from the questionnaire showed a good correlation regarding the importance of the various factors given in part one, and their treatment recommendation made in part two. Still, seven responders (n=36) in the present study showed a low correlation between part one and part two. These responders emphasized one factor differently (*i.e.* The amount of filled cavities in planned pillars)
Six responders regarded that factor as less important in part one. However, the same participants chose to replace the missing tooth with an FPD in case one, on the basis of many filled cavities in adjacent teeth.
In addition one responder also evaluated the age of the patient as being less important. However, the same participant chose to replace the missing tooth with a dental implant, on the basis of the age of the patient.

4.0 Discussion

This study confirmed the hypothesis set. There was a difference in importance of the factors studied when treatment was planned with either a single dental implant or a FPD, concerning replacement of a missing tooth in the maxilla. The factors of bisphosphonates, smoking, oral hygiene, periodontitis, bruxism and diabetes all seemed to be of more importance when placing a dental implant compared to a conventional FPD.

Literature on the subject studied seems limited and the studies found were mostly review articles (29,30). The only questionnaire study found was done on patients (30). Therefore, to our knowledge no questionnaire studies have been performed on dental practitioners and/or specialists.

Performing questionnaire studies always present a challenge. The response rate can be low due to different factors, e.g. lack of interest or time. This study was no exception unfortunately. The questionnaire was distributed to all members of the Norwegian Society for Prosthetic Dentistry. A problem discovered after distribution was, however, that not all members seemed to be specialists. Hundred and nineteen members were listed, but it seems that only approximately 80 of them were specialists in prosthodontics (personal communication, Carl Hjortsjö, board member). Therefore it is conceivable that members, who received the questionnaire, did not answer the questionnaire because they were unqualified relative to the criteria for responding. In that case, the considerably low response rate of 32,1 % could have increased to 43,8% if only specialists could have been selected from the group of participants. That is still low but would give the study a preferable tendency of factors that are important to consider before replacing a single missing tooth.
The advantage to provide the questionnaire only to specialists in prosthodontics was that they could be expected to be updated on both treatments, and that they do work with patient cases like the two presented in the questionnaire.

Two clinical cases were included in part 2 of the questionnaire. This was made in an attempt to assess if the answers in the part 1 showed any compliance with the responders motivation for their choice of treatment in part 2.
When the two parts of the questionnaire were compared, a good compliance was shown, except for one factor; “adjacent teeth with several filled cavities”. The participants’ opinion concerning this factor in part 1 showed less conformity. The answers in part one was also not

in accordance with literature on the subject. (31) When the participants of the present study answered on clinical choice of treatment in part 2, however, the response did reflect the opinion of the article, which still indicate that "adjacent teeth with several filled cavities" favours FPD as the treatment modality despite the conflicting answer in part 1.
Before distribution of the questionnaire a pilot study was made. This showed an overall good compliance, suggesting that the questionnaire seemed to be well designed. Some of the factors in the study seemed, however, somewhat complex for the participants to evaluate in the questionnaire. Thus the form could have been more specified; for example regarding bisphosphonate treatment (per oral bisphosphonates versus intravenous bisphosphonates).

Smoking, periodontitis and oral hygiene
Smoking has impact on both general and oral health. Many functions in the oral cavity can be altered by smoking, and among the most important is that it can lead to periodontitis (32,33).
It is assumed that smoking alters long time prognosis of FPDs because of the risk of periodontal disease, even though smoking itself have not been consider as a risk factor for FPD (34). Smoking behaviour and the connection with periodontics seems therefore crucial for the prognosis for FPD as well as for dental implants. Still, the responders of the present study seemed not to reckon smoking as a very important factor for FPD treatment, even though the literature has stated that smoking can lead to periodontal disease, and the fact that deep pockets can be observed twice as often in smokers, compared to non-smokers (32).
It is therefore worth noticing that smoking was not ranked as high as one could expect among the responders, especially since the responders considered moderate/severe periodontitis important for both treatment modalities. Periodontitis is regarded as a complicating factor in relation to prosthodontic treatment due to the fact that both natural teeth, which serve as pillars to a bridge, and dental implants, can be lost due to periodontal disease (34,35).
The participants did however regard smoking and implants in contest/similar to what is found in the literature. I. E: Argueta et al. conclude that smokers had an increased risk for peri-implantitis (36). Several other studies also establish a connection between smokers and elevated risk for peri-implantitis(37,12). Based on these articles it seems like the participants answered this question in accordance with current research on the matter.

Few of the responders thought however, that mild periodontitis was an important factor to consider, regardless of the fact that it can be a predisposal factor for more severe

periodontitis over time. Brägger et al made a follow up study on a group of patients with mild periodontitis over 8 years. They detected an increase in plaque index and even tooth loss, due to limited supportive care and irregular follow-up (38).

Bacteria from plaque play a significant role in the ethiology of both periodontitis and peri-implantitis. The risk of peri-implantitis may be the reason why the participants of this study rated oral hygiene as more important before implant treatment than for FPD. However, the micro flora of peri-implantitis differs from the micro flora of perio-healthy individuals (39).

According to Fugazzotto one of the disadvantages of an FPD is that the patient has more difficulties performing adequate home care around a three-unit fixed bridge (40).

Furthermore, it was stated that FPD treatment must be considered as a relative hindrance to oral hygiene efforts compared to implant treatment. Al Quran et al. assessed reasons for replacing a single missing tooth. The results showed that the prerequisite of poor oral hygiene favours the implant treatment. Their study contributes to the opinion of oral hygiene being more important when considering FPD relative to dental implant treatment, simply due to the challenges of keeping the surrounding areas clean from plaque (41).

Therefore, it seems that even mild periodontitis will indicate a need for closely follow-up of the patient and motivation for oral hygiene. It will also be of importance when prosthetic treatment is considered, especially if the patient also is smoking (12,33).

Parafunctions

Bruxism is considered the most common parafunctional activity of the masticatory system, and can be regarded as a comprehensive term for tooth clenching and grinding of teeth (42). Bruxism was also, according to a majority of the responders, important to consider before treatment with dental implants. Lobbezoo et al. showed that bruxism is generally considered a contraindication for dental implants, although the evidence is usually only based on clinical experience (43). The same authors stated that there was insufficient evidence to support or refute a causal relationship between bruxism and implant failure. In the present study no difference in importance between the anterior and the posterior region was found (i.e. equal high importance). It was not possible, however, to determine from the questionnaire if any of the participants regarded this factor as a contraindication for placing a dental implant. Thus it is a possibility that some of the responders have had previously negative clinical experiences with dental implants and patients with bruxism, and subsequently regarded this as an important factor.

Also for FPD treatment, bruxism can be an obstructing factor (44). The prognosis of FPDs has been found to be lower in patients suffering from bruxism than in non-bruxism patients (42).

The present study showed that the responders reckon bruxism somewhat more important in the posterior region than in the anterior region, possibly due to higher masticatory forces in the molar area than in the canine/incisor area (43).

The responders thought that arch shape was a very important factor when considering a single dental implant in the posterior region. According to G. SAGAT et al (42), arch shape has a great influence in distributing stress when planning a total of 6 implants or more. However, no articles were found assessing the influence of arch shape on single implants placed either in the anterior or in the posterior region.

Age

Age seemed not a factor for consideration among the responders except for the age group 0-29 yrs. This was considered very important by more than half of the participants. This may be due to the fact that this age group includes children and adolescents. According to a 10-year follow-up study (45), premature insertion (uncompleted facial growth) of dental implants will lead to infraocclusion of the implants. It seems as if the participants took this fairly into consideration. The number of participants considering this important could perhaps have been reduced, by adding a specific group representing children/adolescents to the age category.

In regards to FPDs the participants did not generally evaluate age as an important factor. There were not found any articles were the age-group 0-29 and FPD were considered, but in an article by Glantz and Nilner (46), they concluded that FPD is favourable treatment in all age groups in the adult Swedish population. In other words it seems that age is not a significant factor regarding treatment with FPDs.

Diabetes, bisphosphonates and cardiovascular diseases

Even though older ages not were considered as important among the responders, one have to bear in mind that with increasing age, the risk for diseases having importance for treatment planning will increase. In the questionnaire, such conditions were asked upon, "diabetes", "use of bisphosphonates" due to treatment of osteoporosis and "cardiovascular diseases".

Concerning diabetes the results of this study indicates that the responders seemed to be well aware of the problems that may occur in patients with diabetes. The literature describes diabetes as a systemic disease associated with an increased incidence and progression of periodontitis and peri-implantits. This may contribute to tooth / implant loss and plays a

significant role in prognosis of FPD treatment or dental implant treatment in such patients (47,48).

Unfortunately, the questionnaire did not specify the type of diabetes (I/II). Therefore the results and conclusions drawn concerning the issue can only be speculative. However, independent of the type of diabetes, the success of the treatment is provided that diabetes is well controlled (29,49,50).

Bisphosphonate-related osteonecrosis of the jaws (BRONJ) has been reported as a complication after inserting dental implants (51). The responders seemed to be well aware of the risk and looked upon bisphosphonates as a very important factor to considered when treatment with implants was planned (52).

The mode of administration has been found critical regarding BRONJ. Even though this complication is described as rare and more associated with intravenous administration it is still a complicating factor (52). The literature concludes that implant surgery is not a confident treatment with earlier or on going intravenous bisphosphonate treatment. There is also a consensus among authorities in bone and mineral research that treatment with intravenous bisphosphonates and dental implants is not advisable (53). According to the same authors, it is recommended that dental invasive procedures should be performed before patients begin with oral bisphosphonate therapy, or just after initiating treatment. Unfortunately, the present study did not specify how the bisphosphonates was administered, intravenous or per oral administration, so it is not possible to look at differences in importance regarding the issue of administration.

Conventional FPD is recommended as an option to implants and the literature and the responders of the present study agreed in that matter. Even though osteonecrosis have been reported due to local trauma against the jaw. One risk factor reported in connection with FPD, is the risk of ischemic osteonecrosis under the pontic due to local trauma, (e.g. result after an extraction) (52)). In addition, subgingival preparation to the bone level should be avoided.

For persons with cardiovascular diseases, stress can complicate treatment and have to be taken into consideration. In the literature dental procedures are described to contribute to an increased stress level (e.g. “white coat phenomenon”), with the possibility of elevating the baseline blood pressure, which is a risk factor for these patients. In order to reduce complications, certain prophylactic measures could be implemented, i.e. short appointments, preferably in the morning, the use of local anaesthesia with moderate amount of epinephrine, and awareness of common side effects of the medication these patients may be using (54).

In this respect implant treatment is a process that requires preliminary examinations and careful treatment planning, the treatment usually requires more visits compared with FPD, which is reflected by the answers in the survey (55).

Economics and treatment decisions

The result of the present study showed that several factors had impact on the final treatment therapy and the treatment modality was case-dependent.

Half of the responders felt that patient economics was a limiting factor for choosing the best alternative according to the practitioner. This does indicate that the cost of the treatment is a great determinant. Long-term financial economic comparison shows a similar outcome for single implants and FPD's (56).

In the present study some of the responders did only display one treatment alternative for the patient. This may be because patients have been reported to get confused when receiving different treatment alternatives (57). Still, patients have the right to be informed about different treatment alternatives if alternatives can be presented. In the present study, specialists were asked so the responders that only had one alternative probably was ”guided” by the questionnaire and the ”real patients” would have more than one alternative to consider. Among general practitioners, however lack of knowledge on treatment options can be a problem and it has been reported that general dental practitioners have felt unconfident about providing an implant-supported reconstruction (58). Most of the responders in the present study, however, displayed more than one treatment alternative; making it the patient's call to decide which treatment alternative they want. Their expectations regarding treatment should be assessed and along with the dental professionals opinion, the choice of treatment / no treatment can be made (59). Part 2: Need becoming demand, demand becoming utilization.”).

5.0 Conclusion

Within the limitation of this study the following conclusions was drawn: several of the factors studied have influence on the choice of treatment, and each of them can be a relative contraindication for treatment with either a dental implant or a FPD. Treatment decision can be complex, due to the fact that patients can possess several different factors, and not just one of them. Therefor the treatment decision must be highly individual and based on each spesific

patient. It can be concluded that a thorough treatment planning is mandatory for an adequate outcome. Good communication with the patient in regards to their wishes and expectations must also be taken into consideration.

6.0 Acknowledgement

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I denne spørreundersøkelsen ser man nærmere på behandling av enkle tannluker i maxilla.

DEL 1 av undersøkelsen retter seg mot dine vurderinger av faktorer som anses relevante for to typer behandling, erstatning av tapt tann med 3-ledds bro og ved implantat.

DEL 2 består av to pasientkasus med kliniske bilder og en kort anamnese, der du får mulighet til å gi ditt forslag til behandling.

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DEL 1

SPØRRESKJEMA

Personalia

Mann ○ Kvinne ○
Alder:
Uteksaminert:
Studiested:

Antall år som spesialist:
Postnummer:
Privat/offentlig:
Utfører selv implantater: Ja ○ Nei ○

I hvilken grad vektlegger du de ulike faktorene i ditt behandlingsvalg.

0: Uviktig 1: Mindre viktig 2: Viktig 3. Meget viktig

EKSEMPEL
Dersom du synes okklusjonen utgjør en viktig faktor med tanke på å lage en bro, krysser du av for 2 i tabellen for bro. Dersom du synes det er mindre viktig før implantatbehandling, krysser du av for 1 i tabellen for implantat. ***Det er viktig at du avgir svar i begge kolonnene.***

ANTERIORT	BRO 0	1	2	3	IMPLANTAT 0	1	2	3
ESTETIKK								
Leppelinje								
Smilelinje								
Gingivalkontur								
Tannbueform								
FUNKSJON								
Okklusjon								
PARAFUNKSJON								
Bruxisme								
Tannpressing								

POSTERIORT	BRO 0	1	2	3	IMPLANTAT 0	1	2	3
ESTETIKK								
Leppelinje								
Smilelinje								
Gingivalkontur								
Tannbueform								
FUNKSJON								
Okklusjon								
PARAFUNKSJON								
Bruxisme								
Tannpressing								

FØR BEHANDLING
Faktorene her representerer forhold FØR behandling. Undersøkelsen ønsker svar på hvordan du vurderer disse faktorene før du velger behandling.

BEINNIVÅ
Beinnivået anses som adekvat for begge typer behandling

GENERELT	BRO 0	1	2	3	IMPLANTAT 0	1	2	3
PASIENTENS ALDER								
0-29								
30-69								
70+								
RØYKING (sigaretter per dag)								
< 10								
> 10								
ORAL HYGIENE (PLA%)								
<29								
30-49								
>50								
ENDODONTI								
Én eller begge tenkte pilarer er rot-behandlet								
Apikal oppklaring på endobehandlet nabotann								
KARIES / TIDLIGERE RESTAURERINGER I PILAR								
Enkel flate								
Flere flater								
SYKDOM / MEDIKAMENTBRUK								
Diabetes								
Bisfosfonater								
Hjerte/kar								
Endokarditt / kunstig hjerteklaff								
Nedsatt almenntilstand								
Kroniske slimhinnelidelser								

PERIO

Om vi tar utgangspunkt i at pas har en periodiagnose, hvordan vil du da vektlegge diagnosen før eventuell behandling?	0	1	2	3
Mild periodontitt / gingivitt				
Moderat periodontitt				
Avansert periodontitt				

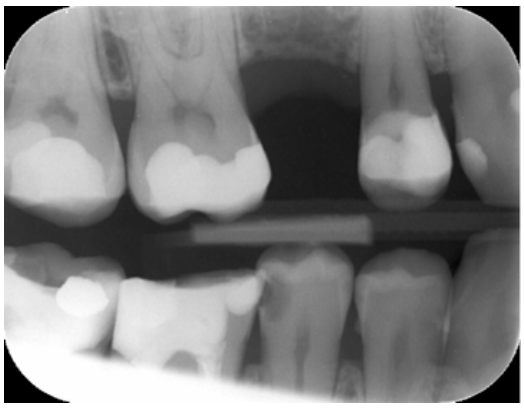
0: Aldri 1: Sjelden 2: Ofte 3: Alltid

KOSTNADER	0	1	2	3
Hvor ofte føler du at kostnadene for pasienten er en begrensende faktor for det du anser som beste terapivalg?				
Ved presentasjon av mulige terapivalg ovenfor pasienten. Hvor ofte legger du frem kun det **du** mener er best for pasienten?				

>>

#1

48 år gammel mann.
Har røkt 5-10 sigaretter daglig i 20 år.
Generalisert moderat periodontitt. Ellers frisk.
Tåler lokal anestesi og penicillin.
Pas ønsker å få tettet tannluken mellom 14 og 16. Pris for behandling er ubetydelig.

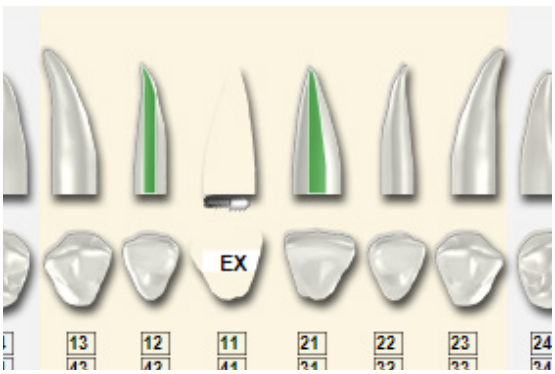


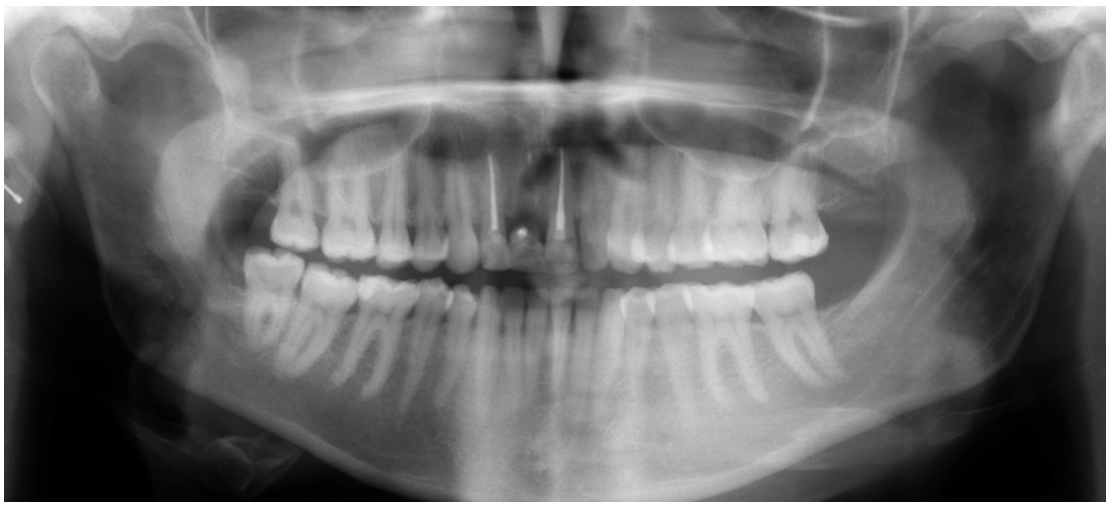
Bro ○ Implantat ○

Vennligst gi en begrunnelse for ditt behandlingsvalg:
(faktorer, indikasjoner/ kontraindikasjoner, konstruksjonsvarighet, etc)

#2

25 år gammel kvinne.
Røyker ikke.
Tåler lokal anestesi og penicillin.
Pas har vært utsatt for sykkeltraume.
12 og 21 rotfylt etter traume. Ønsker å få erstattet tann 11.





Bro ○ Implantat ○

Vennligst gi en begrunnelse for ditt behandlingsvalg:
(faktorer, indikasjoner/ kontraindikasjoner, konstruksjonsvarighet, etc)

TAKK FOR BESVARELSEN! VENNLIGST LEGG SKJEMAENE I VEDLAGTE FERDIG FRANKERTE KONVOLUTT!

Appendix 2

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Til protetikere i Norge.

Undersøkelse av faktorer som påvirker valget av behandling mellom implantat og treledds bro i maxilla.

Kjære deltaker!

Dette enkeltstudiet gjennomføres med mål om å forstå hvilke faktorer som du mener er avgjørende når du står ovenfor valget mellom et implantat og en treledds bro i maxilla. Dette i et tilfelle med en enkel tannluke, henholdsvis anteriort og posteriort i maxilla.

Ved å være med på denne undersøkelsen bidrar du til en studie som har som mål å skaffe en oversikt over hvordan du som behandler vektlegger de faktorene som bestemmer ditt behandlingsvalg. Til orientering er en pilotstudie utført på forhånd.

Fyll ut vedlagte spørreskjema nøye. Når du er ferdig, legger du svarbrevet i den vedlagte konvolutten. Denne er addressert og ferdig frankert.
All informasjon vil bli behandlet konfidensielt og ditt svar vil bli avidentifisert før bearbeiding.

Studien inngår som en del av en masteroppgave for fire tannlegestudenter ved Universitetet i Tromsø.

På forhånd, takk!

Ansvarlig veileder
Ulf Thore Örtengren
instituttleder,
professor i biomaterialer,
IKO, Universitetet i Tromsø

Medvirkende veileder
Anders Tillberg
Spesialist i protetikk,
Tannhelsetjensestens
kompetansesenter for Nord-
Norge (TkNN) i Tromsø.

Studenter
Vegard Haug Skogekker
Katrine Horn Skogen
Karoline Sørensen
Kyrre Aas Hustad

Kontaktperson
Kyrre Aas Hustad
master2013.uit@gmail.com
mob 481 72 497

Appendix 3

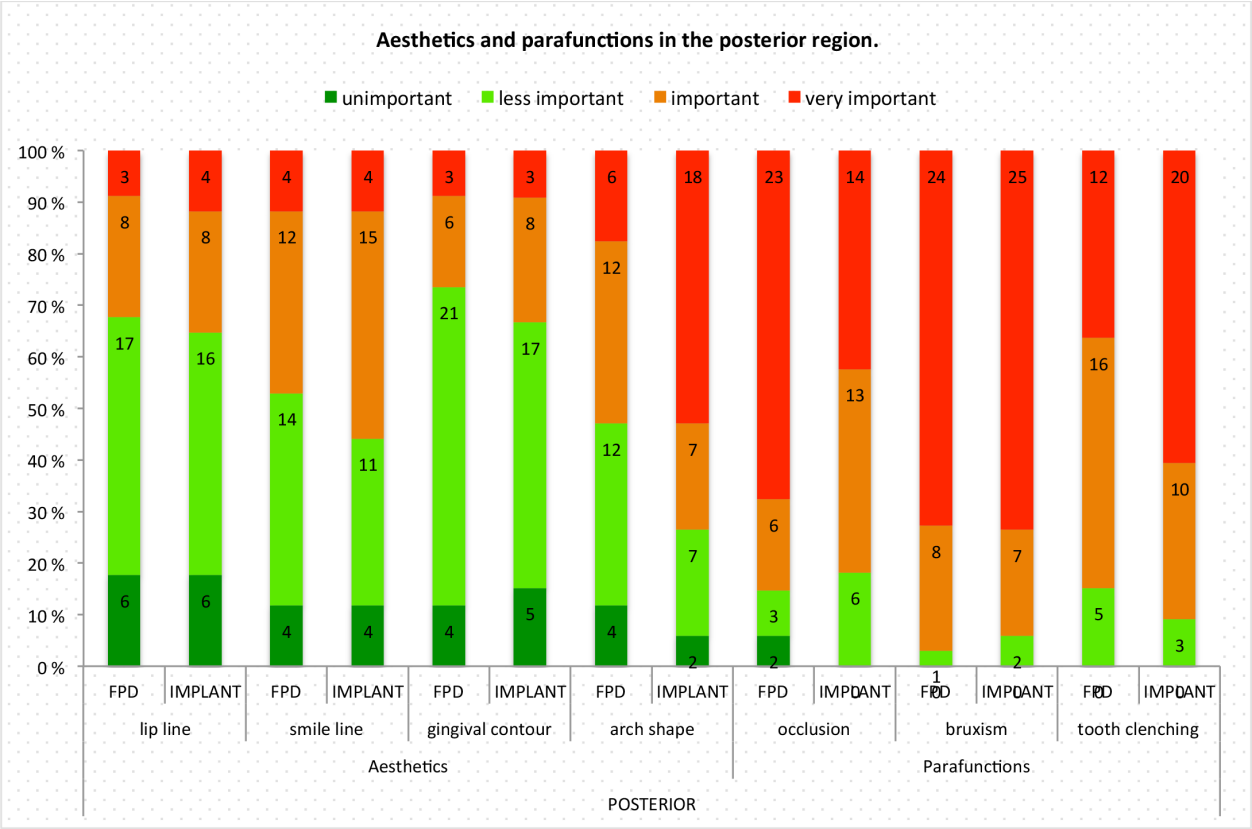

Figure 1: Aesthetics and parafunctions in the posterior region.

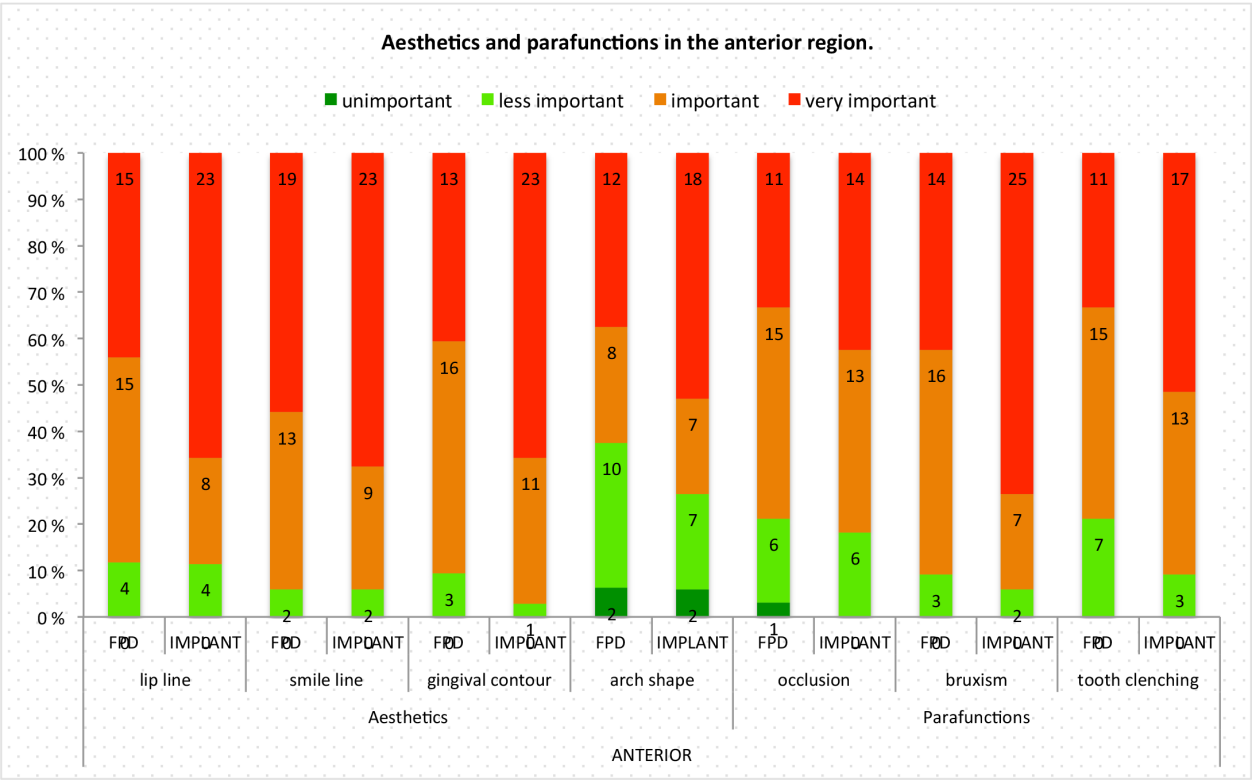

Figure 2: Aesthetics and parafunctions in the anterior region.

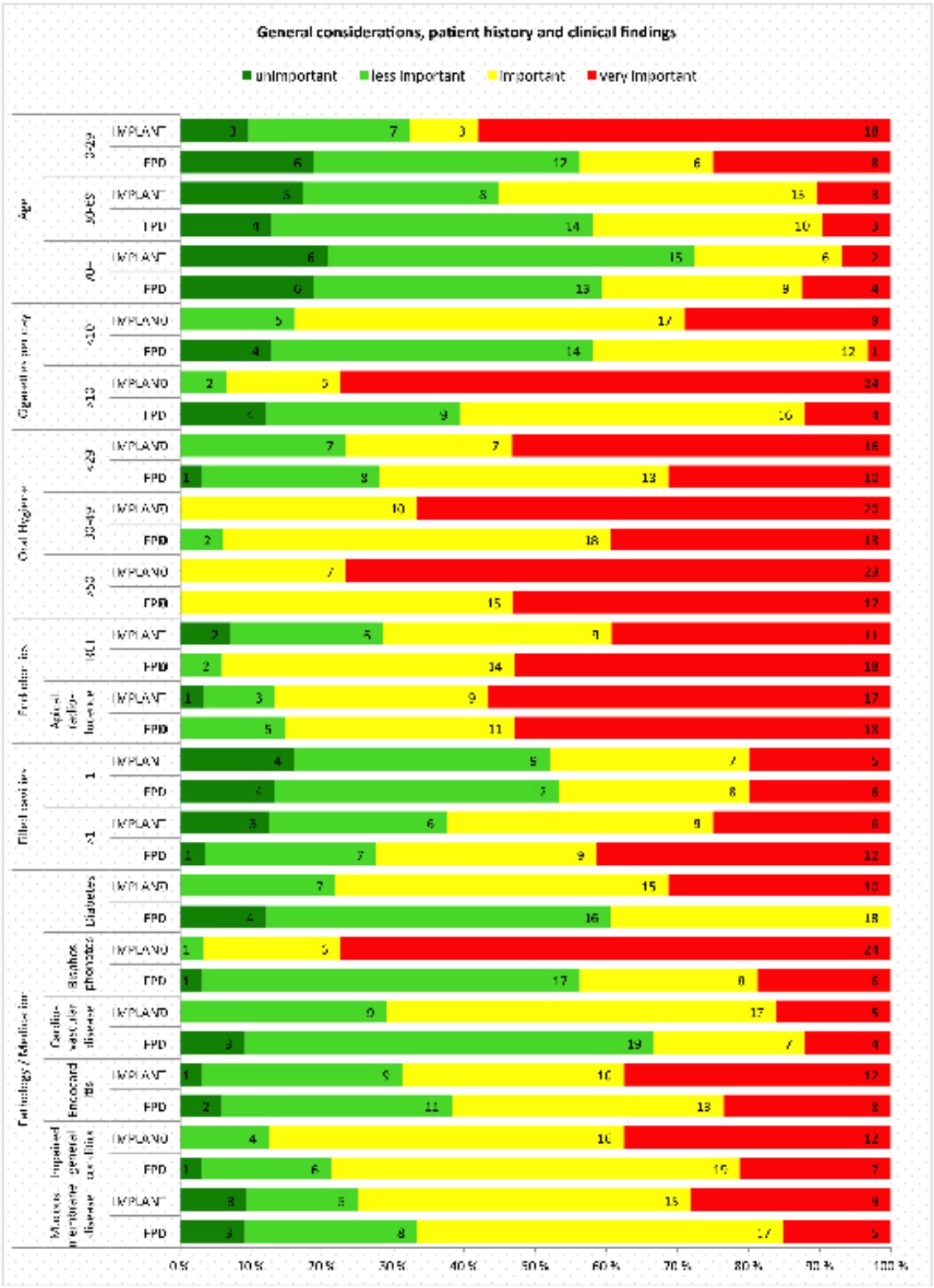

Figure 3: General considerations, patient history and clinical findings.