Immediate implant placement long term success: a case report

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Summary
Immediate implant placement is sometimes a risky procedure particularly when we are replacing front teeth, patients are always expecting quick aesthetic results. This case report will try to show you how this procedure can be provided with a reduced risk for the patient.

Key words
Immediate implant placement, patient selection, aesthetic results, long term success, case report

Introduction
In case of immediate implant placement, the selection of the patient and the site are of primarily importance. This selection will have to integrate anatomical and pathological factors. The following factors will have to be taken in consideration as it has been recommended by the FEI consensus (EVANS & CHEN / 2000):
- medical status
- smoking habits
- patient’s aesthetic expectations
- lip line
- periodontal biotype
- shape of teeth crowns
- infection at implant site
- bone level at adjacent sites
- restorative status of neighbouring teeth
- width of edentulous space
- soft tissue anatomy
- bone anatomy of alveolar crest

One of the most important considerations will be the difficult detection of the patient periodontal biotype!

Fig. 1. Thin periodontal biotype

Soft tissue biotype was previously called gingival biotype or periodontal biotype (OLSSON & LINDH / 1991), but since the advent of implants, this has been renamed to encompass tissue around both teeth and implants (Kan & al / 2005). The term refers to a composite or aggregate of four features of the soft tissues and the teeth they surround that build up to a specific picture:
- gingival width (keratinised tissue width)
- gingival thickness (thick or thin)
- papilla height and proportion
- crown width and height ratio

Fig. 2. Triangular teeth, long pointy papilla, thin periodontal biotype

Thick scalloped periodontal biotypes (Fig. 1 & 2) are characterized by:
- highly scalloped soft tissues and bone contours
- delicate and friable soft tissues
- narrow band of keratinized tissue
- thin bone with dehiscences and fenestrations
- long pointed teeth

Whereas thin flat periodontal biotypes (Fig. 3 & 4) are presenting:
- relatively flat soft tissues and bone contours
- dense and fibrotic soft tissues
- wide band of keratinized tissue
- bone thick with ledges
- short blunt papilla
- short square teeth

This detection is important more particularly to prevent aesthetic complications. Inflammation generated by accumulation of plaque on the root surface extends into the tissue at a distance of 2 mm in all directions (Kan & al / 2010):
- concerning thin biotypes, the distance from the root surface to the oral epithelial surface can be less than 2mm, inflammation will involve all the structures (cementum, periodontal ligmaent, bone and gingiva) rapidly resulting in a recession. Bundle bone (lamina dura) is very likely to be the buccal plate we can expect considerable collapse of the socket, resulting in a contour deficiency; bone grafting and compromised position / angulation of the implant, especially if patient is getting implant treatment in the aesthetic zone. This case report will try to show you how this procedure can be provided with a reduced risk for the patient.

Concerning thick biotypes, due to a thick alveolar housing around the teeth, the 2mm radius of inflammation will damage cementum, ligament and bundle bone only, producing a periodontal pocket. Patients may end up with less alveolar deficiency, restorative treatment can be viewed as being more predictable and less demanding. Per-implant tissue health seems to depend to there being immobile keratinized tissue around the emergent restoration:
- thin peri-implant soft tissues seems to be more prone to recession and less likely to develop nicely formed papillae around implant restorations
- tissue recessions around implants seems to result in absence of immobile keratinized tissue more quickly that around natural teeth, possibly because the shoulder of most implants are placed more apical to the cemento-enamel junction of the teeth they replace.
- immediate implant is associated with increased risk of development of peri-implant diseases and authors recommend an augmentation of the keratinized tissue as one of the treatment strategies in managing peri-implantitis.

A thick soft tissue biotype is a desirable characteristic that will positively affect the aesthetic outcome of an implant supported restoration because thick soft tissue is more resistant to mechanical and surgical insults, is less susceptible to mucosal recession and has more tissue for prosthetic manipulations (COOK & al / 2011). Therefore, although tissue biotype is an inherent trait that varies from patient to patient, it can be transformed through precise management of the implant position, implant design and prosthetic design such that a desired aesthetic outcome is achieved (PU & al / 2010). Most of the literature on implant success rates has not been performed in parallel with the gingival biotype, although it is increasingly accepted that the biotype and tissue volume have an important impact on the aesthetic outcome and minimizing the risk for post-restoration tissue instability.

Case report
Patient is a man, 45 years old; he is presenting good health, he is non-smoker and his oral hygiene is good. He complained five years ago (in 2010) about the presence of a recent diastema between 11 and 21, and about a slight mobility tooth 21 (Fig. 5)

After complete examination, we detected the presence of a root resorption (Fig. 6), so it has been decided to extract this central incisor and to replace it by a dental implant. A complete aesthetic risk assessment of the patient and the site has been done and the results are presented in red inside of Table 1.

An extraction without incisions has been done using periotome in order to preserve the surrounding bone and soft tissues. A Straumann® bone level implant (length 12mm / diameter 4.1mm) has been placed inside the socket in a palatal position and the remaining gap (around 1.5mm) between the implant and the buccal bone wall has been filled with a bone graft Bio-Oss®, and the top of the socket has been protected with a Collacone® without sutures (Fig. 7 & 8) (CORDAIO / 2014).

Then at the end of the same appointment, the extracted tooth (full crown and 5mm of the root) has been used as temporary restoration and fixed to the adjacent teeth using a metal grid. The presence of this previous tooth was of primary importance in order to support the surrounding soft tissues and more particularly the papilla on both sides of the implant (Fig. 9 & 10).

Before to restore the implant with a final crown we took in consideration the latest recommendations concerning cementation on dental implants (TUT / 5th Consensus 2015):
- after bone level implants placement, if the depth of the mucosa margin is deeper than 1.5mm, screw-retained prosthodontics are highly recommended,
- reduce the quantity of cement used to cement prosthetic restorations
- if the patient has been treated previously for periodontal diseases, use only temporary cement, you will have the possibility to remove the superstructure in order to treat an eventual peri-implantitis.

At the time of the final restoration, it is also very important to keep in mind predisposing factors leading to cement retention around dental implants:
- the soft tissue connection around dental implants (epithelial adhesion with hemidesmosomes and absence of connective tissue attachment), which is different from natural teeth (epithelial attachment and connective tissue attachment),
- the sub-gingival placement of the implant more or less deep than the cementum enamel junction of the natural teeth,
- the abutment selection: abutment with a fixed restorative margin 2-5 mm to the implant neck or one-piece implant with a built-in restorative margin,
- the radiographs are unable to show the presence of retained cement on buccal and palatal / lingual side(s),
- the cementation issues (excessive quantity and unsuitable type of cement used),
- the maintenance controls not always respected by a majority of patients.

At the end of a period of healing of 10 weeks, we can see the very good positioning of the soft tissues (Fig. 11), the implant has been exposed (Fig. 12), the depth of the sulcus was more...
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Conclusion

Soft tissue and bone management will have to be done after a complete evaluation of the ratio benefit / risk of the patient; best results will be dependant of the choice of the procedure the most adapted to the patient.

Healing time for soft tissues as well as for bone tissue are of primary importance to obtain successful prosthodontic restorations.

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