Among people, there are many opinions about the contribution of teeth to aesthetic appearance. This is illustrated in a recent newspaper article (Blandy 2009) in which a popular phenomenon was described among some youngsters in Cape Town, South Africa, in whom their healthy incisors had been extracted as fashion statement:

“The laughing young man has a perfect set of teeth.....Suddenly he pops out a pair of dentures, revealing a gap-toothed smile, a common sight among mixed-race Capetonians that has spawned outrageous myths and stereotypes. [...] “It is fashion, everyone has it,” said 21-year-old Yazeed Adams, who insists he had to take out his healthy incisors because they were “huge”. Ronald de Villiers, 45: “my 11 year-old and 14 year-old had already had their teeth out “to look a bit prettier”.....

In contrast to this phenomenon, in Western world, a missing anterior tooth is not considered as being an image of beauty and might have a serious impact on the individual’s life. Usually, these individuels have a strong wish for a prosthetic replacement to rehabilitate function and aesthetics.

Dental implants have conquered a prominent role in contemporary dentistry when it comes to single-tooth replacements. Excellent long-term survival rates (Scheller et al. 1998, Romeo et al. 2002), psychological benefits for the patient and tooth structure conservation, attribute to the growing popularity of dental implants at the cost of conventional bridgework, resin-bonded restorations and removable partial dentures. When primarily the focus was on survival of the implant, currently creation of a high quality restoration for the long-term, satisfying the criteria that reflect function and aesthetics is the ultimate ambition, particularly in aesthetically delicate areas.

It is accepted that after implant placement and through time of function, implants will display some extent of bone loss (Albrektsson et al. 1986, Laurell & Lundgren 2009). However, peri-implant marginal bone loss should be limited, since bone loss may induce pocket formation, which could be unfavorable for long-term health of the peri-implant tissues (Rams et al. 1984, Heydenrijk et al. 2002). From an aesthetic point of view, it is also important to minimize marginal
bone loss. Namely, the level of the peri-implant marginal bone is strongly related to the level of the peri-implant mucosa (Bengazi et al. 1996, Hermann et al. 1997, Chang et al. 1999, Hermann et al. 2000, Hermann et al. 2001). Loss of marginal bone might therefore affect the level of the peri-implant mucosa, which, in turn, is commonly considered as a major factor determining the aesthetic outcome (Furhauser et al. 2005, Meijer et al. 2005).

There is evidence that the design of the implant neck influences the extent of marginal peri-implant bone loss (Shin et al. 2006, Lee et al. 2007, McAllister 2007, Bratu et al. 2009, Nickenig et al. 2009). Although the traditional smooth implant neck is accompanied by the least accumulation of plaque (Teughels et al. 2006, Baldi et al. 2009), several studies found that a rough-surfaced implant neck was accompanied by a significant reduction of marginal bone loss when compared with a smooth implant neck (Shin et al. 2006, Bratu et al. 2009, Nickenig et al. 2009). It has been suggested that an increase in implant surface roughness improves bone integration in terms of the quantity and quality of bone formation at the implant-bone interface (Cooper 2000). It is likely that, when incorporated in the implant neck, these rough surface qualities are responsible for reducing marginal bone loss. Furthermore, it has been reported that retention elements at the implant neck, such as grooves or microthreads, favor the preservation of marginal bone (Palmer et al. 2000, Shin et al. 2006, Lee et al. 2007). It is believed that these microthreads bring about a major decrease in interfacial shear stress on the cortical bone, resulting in less marginal bone loss (Hansson 1999). In addition to the surface characteristics of the implant neck, it has been suggested that a scalloped implant platform might preserve proximal marginal bone (Wohrle 2003, Kan et al. 2007, McAllister 2007). This hypothesis was based on the thought that a scalloped implant neck mirrors the natural alveolar ridge curvature, particularly in the anterior zone, and consequently a more non-violent position of the implant-abutment interface can be realized compared to common flat platform implant designs.

Apart from the role of the implant neck design, the concept of immediate loading has gained attention in contemporary implantology. This concept is defined as the application of a load by means of a restoration within 48 hours after implant placement (Laney 2007) and deviates from the conventional load-free healing period of several months. Patients in need for an anterior single-tooth replacement may benefit from immediate loading. Placement of the (provisional) implant crown immediately after implant placement reduces overall treatment time, avoids a second-stage operation and offers immediate oral comfort as there is no need for a provisional removable prosthesis during the healing phase. Furthermore, it has been hypothesized that immediate loading might be advantageous for the appearance of the peri-implant soft tissue, since healing occurs...
against a natural form immediately after implant surgery (Glauser et al. 2006). Besides the beneficial effects of immediate loading, this loading concept has also some inherent thought disadvantages. Amongst others, immediate loading may induce micromotion and instability of the implant (Gapski et al. 2003, Trisi et al. 2009). Next, implant instability may result in fibrous encapsulation of the implant and failing osseointegration (Lioubavina-Hack et al. 2006).

There is, however, a paucity of well-designed trials addressing the effect of the implant neck design on bone and soft tissue parameters. Furthermore, the aesthetic outcome and patient satisfaction are underexposed in anterior single implant research (Belser et al. 2004). The same shortcomings apply to trials investigating immediate implant loading as being a reliable strategy to replace an anterior tooth (Gapski et al. 2003). To gain more insight into the questions raised in this and the previous paragraphs, the general aims of this thesis were:

- to compare the treatment outcome of single-tooth implants with different neck designs placed in the maxillary aesthetic zone;
- to compare the treatment outcome of immediate loading with conventional loading of single-tooth implants placed in the maxillary aesthetic zone.

The specific aims of this thesis were:

- to review systematically the literature regarding the efficacy of single implant therapy in the aesthetic zone (Chapter 2);
- to compare the marginal bone level change and clinical outcome of implants with a 1.5 mm smooth neck, a rough neck with grooves and a scalloped rough neck with grooves used for single-tooth replacements in the maxillary aesthetic region (Chapter 3);
- to evaluate the aesthetic outcome of the above mentioned implant neck designs from a professional’s and patient’s perception (Chapter 4);
- to compare immediate loading with conventional loading of single-tooth implants in the aesthetic zone for marginal bone level change, clinical and aesthetic outcome and patient satisfaction (Chapter 5).

The immediate loading protocol of our study is illustrated in a detailed clinical report (Chapter 6). Furthermore, a chapter is devoted to how to treat a trauma to an anterior implant crown (Chapter 7).
References


Blandy, F. (2009) Cape Town’s passion gap: sexual myth or fashion victimhood? Telegraph.co.uk


