

# Immediate Implants

## Tips for improving the outcome in the aesthetic zone

**N**ot long ago, I attended a scientific meeting here in Spain. One of the speakers was a prestigious and well-known researcher in the field. His lecture was going great until he said this: "Immediate implants are no longer an option in implant dentistry. Everyone who performs immediate implants should be aware that they're doing something that's not predictable in any case."

Almost everyone, including me, disagreed. The speaker based his premise on animal experimentation, which doesn't always exactly mimic natural responses in human behavior. Some colleagues disagreed more vehemently than others—the man next to me, for example, suggested that the speaker should head to a legendary place of eternal misery. (No, not Wal-Mart on Black Friday, but close.)

I, meanwhile, decided to write this article for *Dentaltown*. These tips can be easily applied in your daily practice (and all are based on scientific publications, so you can feel confident about what you read).

Before starting with the cool stuff, though, let's discuss the biological and anatomical considerations of what happens after an extraction.

## Bone healing

In implant dentistry, it's important to know what events take place after an extraction—many times, because we want to prevent them. If we take a look at the literature, we should know that major changes in an extraction site take place during the 12 months after tooth extraction.<sup>1</sup>

- There's around 50 percent reduction of the total width the first year, which means a variation of 5–7 millimeters.<sup>2</sup>
- Approximately two-thirds of this reduction occurs within the first three months after tooth extraction.
- It doesn't matter if the extraction is in the mandible or maxilla—similar volumetric change is expected in both areas.
- Bone formation is the most common phenomenon during the first three months. After this period, bone remodeling takes place.
- One-millimeter height loss is expected.

## Bone dynamics

On the other hand, from a histological point of view, some other events also take place after an extraction.<sup>3</sup>

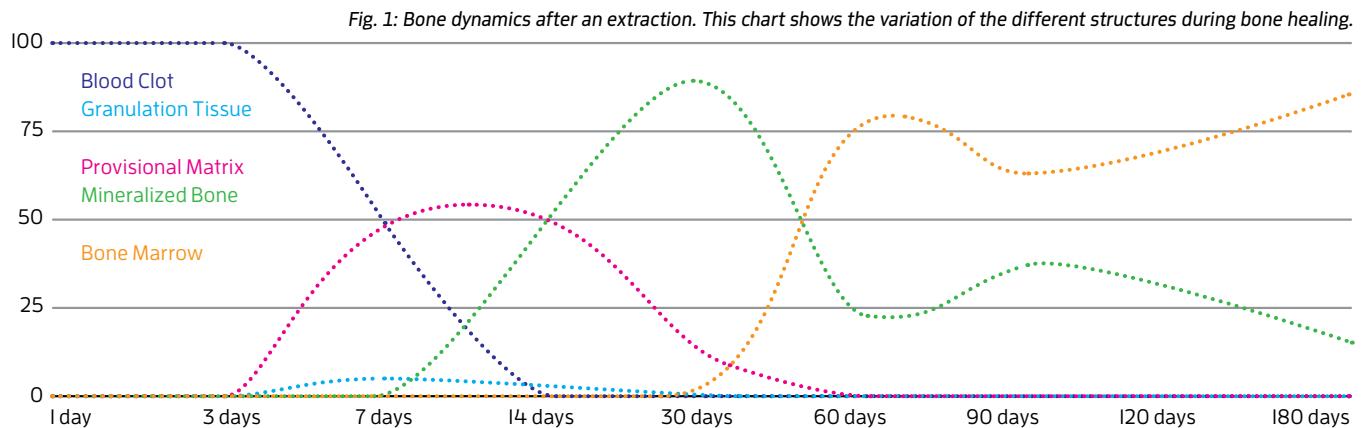
- The first present element is a blood clot, which is replaced by granulation tissue during the first week (Figs. 2a–b).

- The granulation tissue is present mainly in the most coronal portion of the socket, while in the other two-thirds, the blood clot is replaced by a provisional matrix. This granulation tissue is filled with inflammatory cells, in response to the presence of infectious material in the oral cavity (Fig. 2c, p. 82).
- After 30 days, the socket is sealed with a keratinized mucosa (Fig. 2d, p. 82).
- Hard-tissue formation begins after two weeks of healing, during which half of that provisional matrix area—the most apical part of the socket—will be filled by woven bone.
- After two months of healing, a hard tissue bridge covers the marginal portion of the socket, and a periosteum is now attached to the lining mucosa (Fig. 2e, p. 82).
- The woven bone is gradually replaced by lamellar bone (Fig. 2f, p. 82).

## Postextraction dimensional changes

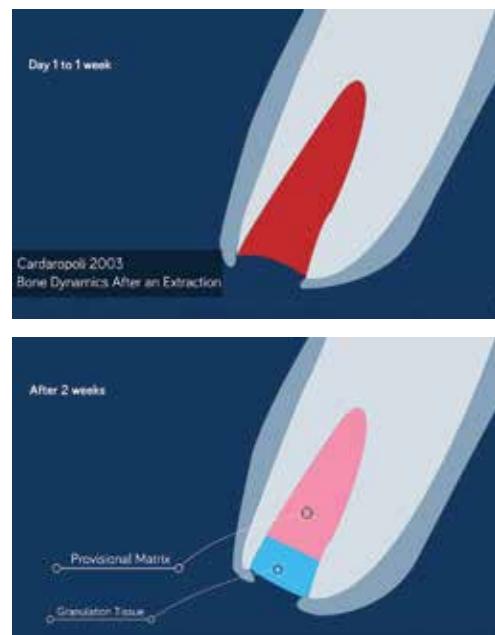
Why is a collapse more likely to happen in the buccal wall? A structure called bundle bone is dependent on the blood supply from the periodontal ligament, and is resorbed when the extraction is performed.<sup>4</sup>

The average width of the bundle bone is around 0.2–0.4 mm,<sup>4</sup> which in some cases



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Figs. 2a–b: Day 1 to one week. The first element that is present is a blood clot, which is replaced by granulation tissue during the first week.

represents the entire buccal wall.<sup>5</sup> When this bundle bone is entirely resorbed, there is a collapse of the buccal bone.

That's when all the problems begin, and that's why immediate implants in the aesthetic zone should be considered with caution.

### Case selection is the key to success

To have an accurate case assessment, use the Esthetic Risk Assessment (ERA) tool (Fig. 3).<sup>6</sup>

I've created an Excel system that lets me determine if the case in front of me is complex, straightforward or advanced (Fig. 4) by tallying the number of red, green and yellow boxes. It's essential to see whether the red boxes outweigh the green, meaning the case isn't suitable for an immediate case. For greater predictability, it's more important to have a larger number of green boxes.

I also focus on three important points:

- The lip line.** This will determine if any mistakes you may commit will be visible.
- The soft tissue biotype.** Recession is more likely to happen in a thin biotype.<sup>7</sup>



Fig. 2c: After two weeks, hard tissue formation starts. Half of the 2/3 of the most apical part of the socket has been filled by woven bone.



Fig. 2d: After four weeks, the socket is sealed with a keratinized mucosa.



Fig. 2e: After two months, a hard-tissue bridge covers the marginal portion of the socket, and a periosteum is now present that is attached to the lining mucosa.



Fig. 2f: After more than two months, the woven bone is gradually replaced by lamellar bone.

## Esthetic Risk Analysis for Implant Dentistry

Fig. 3

ESTHETIC RISK FACTOR	LOW RISK	MODERATE RISK	HIGH RISK
Medical Status	Healthy, cooperative patient with an intact immune system		Reduced immune system
Smoking habit	Non-Smoker	Light smoker (< 10 cigs/day)	Heavy smoker (> 10 cigs/day)
Patient's Esthetic Expectations	Low	Medium	High
Lip Line	Low	Medium	High
Gingival Biotype	Low scalloped, thick	Medium scalloped, medium thick	High scalloped, thin
Shape of Tooth Crowns	Rectangular		Triangular
Infection at Implant Site	None	Chronic	Acute
Bone Level at Adjacent Teeth	< 5mm to contact point	5.5mm to 6.5mm to contact point	> 7mm to contact point
Restorative Status of Neighboring Teeth	Virgin		Restored
Width of Edentulous Span	1 tooth (> 7mm)	1 tooth (< 7mm)	2 teeth or more
Soft-Tissue Anatomy	Intact soft tissue		Soft-tissue defects
Bone Anatomy of Alveolar Crest	Alveolar Crest without bone deficiency	Horizontal bone deficiency	Vertical bone deficiency

- 3. The patient expectation.** Make sure that the outcome the patient seeks is possible, from a biological and functional point of view. (Also be aware of the expectations of the patient's girlfriend, mother or any other relatives. I once had an unscheduled quarrel with a patient's relative, which wasn't a pleasant experience.)

### Anatomical conditions are optimal in 81 percent of cases

We always have to check the integrity of the sockets, because "the presence of interproximal bone is mandatory if you want to get some papilla around the restoration."<sup>8</sup>

The presence of the buccal bone will determine if you should perform a more conservative approach. The Elian classification (Fig. 5) is useful in this case: A Type I socket is favorable for an immediate implant placement, while Types II and III would need augmentation procedures.<sup>9</sup> (See Figs. 6a-d on p. 84.)

It's strongly recommended to use a CT scan to check the sagittal root position in relation to the anterior maxillary osseous housing.

### Surgical tips: The ideal implant size, position and geometry

Choosing the "right" implant can be a controversial point, so I'll try to be polite.

Primary stability has been suggested to be a key prognostic for osseointegration.<sup>10</sup> Other studies suggested that implants without primary stability could be osseointegrated when they were left undisturbed during the healing process.<sup>11,12</sup>

It is, in fact, important to achieve an optimal primary stability if we are going to perform an immediate restoration. A torque of 10 Ncm could be enough, as long as the provisional is bonded to the adjacent teeth.<sup>13</sup> But I wouldn't recommend loading an implant placed with that torque. You'll feel more confident if a higher torque is used during the implant placement. Higher torque means higher survival rate and also fewer complications.<sup>14</sup>

What's the best implant geometry for an immediate implant? It seems that conical implant achieves a more optimal primary stability in a fresh extraction socket,<sup>15</sup> but we should know that the spontaneous filling of the gap is significantly better in cylindrical implants than in conical ones.<sup>16</sup>

**Implant diameter:** If we read some articles about immediate implants, we may notice that some authors used to choose implants with a diameter up to 5mm.<sup>17</sup> However, this can bring negative consequences for the stability of the peri-implant soft and hard tissues.<sup>7</sup> That's why the implant diameter must be chosen in regard to the buccal-palatal width, and not the mesiodistal distance. The implant diameter in the anterior maxilla should be less than 4.5mm.

**Implant position:** A 3-D implant position is crucial to achieve an aesthetic outcome.

Figs. 7a-e (p. 84) illustrate some new concepts.

We need to avoid our implant drifting buccally. Start drilling

Fig. 4

Etiologic risk factors	Risk Level		
	Low	Medium	High
Medical Status	Healthy, cooperative patient with intact immune system		
Smoking Habit	Non-smoker		
Patient's esthetic expectations			High
Patient's esthetic expectations			High
Tissue Biotype		Medium	
Shape of tooth crowns		Medium-scalloped, medium-trap	
Infection-free implant site	None		
Bone level at adjacent teeth		5.5 ± 0.5 mm to contact point	
Restorative status of neighboring teeth	Virgin		
Width of edentulous span	1 Tooth < 2 mm		
Soft-tissue anatomy			Soft-tissue defect

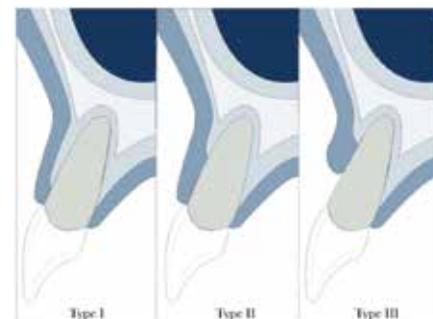


Fig. 5

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**Fig. 6a:** Type I. The root is positioned against the labial cortical plate. A considerable amount of bone is present on the palatal aspect for implant engagement to attain primary stability.



**Fig. 6b:** Type II. The root is centered in the middle of the alveolar housing without engaging either the labial or palatal cortical plates at the apical third of the root. The amount of bone may not be adequate to ensure implant stability.



**Fig. 6c:** Type III. The root is positioned against the palatal cortical plate. The stability of the implant relies on its engagement in the available bone on the labial aspect.

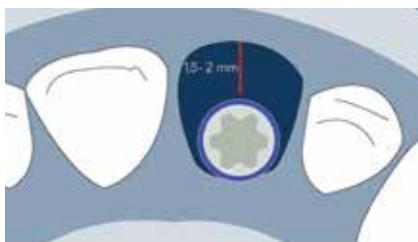


**Fig. 6d:** Type IV. At least two-thirds of the root is engaging both the labial and palatal cortical plates. (Class IV is considered by the authors to be a contraindication for immediate implant placement.)

Figs. 6a-d: In a nutshell, a Type I socket is the most favorable and the most common—around 81 percent, in a sample size of 600 patients.<sup>5</sup>



**Fig. 7a:** Implant placed too buccally. This will be difficult to restore, and may increase biological complications.



**Fig. 7b:** An ideal jumping distance of 1.5–2mm (ideal from a prosthetic point of view).



**Fig. 7c:** The implant engaging the buccal wall will promote bone resorption, biological and restorative complications.



**Fig. 7d:** An implant placed at the root tip will be drifted buccally because of the density of the palatal bone.



**Fig. 7e:** Placing the implant engaging the palatal wall will provide an ideal prosthetic position and gap size (1.5–2 mm).

in the palatal wall, avoiding the root tip. This will provide an ideal position to restore the implant, and an ideal gap between the implant and the buccal wall.

Avoiding the buccal wall also will save us a lot of biological complications. Remember: Never engage the implant to the buccal wall.

### Using a SCTG simultaneously with immediate implants placement

Using a subepithelial connective tissue graft, or SCTG, while placing immediate implants improves the stability of the peri-implant soft tissue.<sup>18, 19, 20, 21</sup>

When compared with immediate implants without connective tissue graft, an SCTG was shown to be beneficial in maintaining facial gingival level.<sup>22</sup>

### Prosthetic tips: Provisional restoration and the ideal emergence profile

Provisionals are essential if we seek an aesthetic outcome. In the case of immediate implants, some authors have suggested that the provisional is important to maintain the dentogingival architecture.<sup>22</sup>

I'd like to add that the use of a CAD/CAM PMMA may be the best option, as it has been proven to have optimal mechanical and biological behavior.<sup>23</sup> It's an important part of my workflow when I perform a digital socket shield technique, too.

Concave emergence profiles seem to have a positive impact.<sup>24, 25</sup> We should consider using a definitive abutment, placed the same day of the surgery, to avoid further disconnections.<sup>26</sup>

Figs. 8a-d (see periospot.com) illustrate how this concave profile can be applied.

### Conclusions

Although this is a controversial topic, I believe these points can be useful from a clinical point of view:

The use of SCTG is mandatory in case of thin biotypes. Also, the use of a provisional is a "must-have" in every restoration with a demanding aesthetic outcome. And we can't forget that everything else won't make

sense if the implant isn't placed in an ideal 3-D position.

The trimodal approach (immediate implant, flapless, immediate restoration) is a reliable and predictable procedure.<sup>27</sup> In some cases, other techniques and features can be added to this approach:

- Subepithelial connective tissue graft, in case of a thin biotype
- Incorporate PMMA CAD/CAM provisionals
- Socket shield technique (although it's yet to be seen if this approach is predictable in the long term)

It can be an individualized approach by every clinician who incorporates scientific-based knowledge. ■

#### References

1. Schropp L, Wenzel A, Kostopoulos L, Karring T. Bone healing and soft tissue contour changes following single-tooth extraction: a clinical and radiographic 12-month prospective study. *Int J Periodontics Restorative Dent.* 2003;23:313–323.
2. Johnson K. A study of the dimensional changes occurring in the maxilla following tooth extraction. *Aust Dent J.* 1969;14(4):241–244. doi: 10.1111/j.1834-7819.1969.tb06001.x.
3. Cardaropoli G, Araujo M, Lindhe J. Dynamics of bone tissue formation in tooth extraction sites. An experimental study in dogs. *Journal of Clinical Periodontology.* 2003 Sep;30(9):809–18.
4. Araújo MG, Sukekava F, Wennstrom JL, Lindhe J. Ridge alterations following implant placement in fresh extraction sockets: an experimental study in the dog. *Journal of Clinical Periodontology.* 2005 Jun;32(6):645–52.
5. Januario AL, Duarte WR, Barriviera M, Mesti JC, Araujo MG, Lindhe J. Dimension of the facial bone wall in the anterior maxilla: a cone-beam computed tomography study. *Clin Oral Impl Res.* 2011; 10: 1168–1171.
6. Cordaro L. Implants for restoration of single tooth spaces in areas of high esthetic risk. In: Dawson A, Chen S, Buser D et al, eds. *The SAC Classification in Implant Dentistry.* Quintessence Publishing; 2009:50–56.
7. Kan JY, Roe P, Rungcharasaeng K, Patel RD, Waki T, Lozada JL, et al. Classification of sagittal root position in relation to the anterior maxillary osseous housing for immediate implant placement: a cone beam computed tomography study. *Int J Oral Maxillofac Implants.* 2011 Jul; 26(4):873–6.
8. Kan JY, Rungcharasaeng K, Lozada, J. L. & Zimmerman, G. (2011) Facial gingival tissue stability following immediate placement and provisionalization of maxillary anterior single implants: a 2- to 8-year follow-up. *International Journal of Oral and Maxillofacial Implants* 26, 179–187.
9. Kan JY, Rungcharasaeng K, Umezawa K, Kois J. Dimensions of peri-implant mucosa: An evaluation of maxillary anterior single implants in humans. *J Periodontol* 2003; 74:557–562.
10. Brunski JB. Biomaterials and biomechanics in dental implant design. *Int J Oral Maxillofac Implants* 1988; 3:85–97.
11. Ivanoff CJ, Sennerby L, Lekholm U. Influence of initial implant mobility on the integration of titanium implants. An experimental study in rabbits. *Clin Oral Implants Res* 1996; 7:120–127.
12. Rodrigo, D., Aracil, L., Martin, C. & Sanz, M. (2010) Diagnosis of implant stability and its impact on implant survival: A prospective case series study. *Clinical Oral Implants Research* 21: 255–261.
13. Norton, M.R. (2011) The influence of insertion torque on the survival of immediately placed and restored single-tooth implants. *The International Journal of Oral & Maxillofacial Implants* 26: 1333–1343.
14. Ottoni JM, Oliveira ZF, Mansini R, Cabral AM. Correlation between placement torque and survival of single-tooth implants. *Int J Oral Maxillofac Implants.* 2005; 20:769–776.
15. Kan JY, Roe P, Rungcharasaeng K. Effects of Implant Morphology on Rotational Stability During Immediate Implant Placement in the Esthetic Zone. *Int J Oral Maxillofac Implants.* 2014 Dec 31; 30(3):667–70.
16. Tomasi C, Sanz M, Cecchinato D, Pjetursson B, Ferrus J, Lang NP, Lindhe J. Bone dimensional variations at implants placed in fresh extraction sockets: a multilevel multivariate analysis. *Clin Oral Impl Res* 2010; 21: 30–36.
17. Kan JYK, Rungcharasaeng K. Site development for anterior implant esthetics: The dentulous site. *Compend Cont Educ Dent.* 22:221, 2001
18. Cornelini R, Barone A, Covani U. Connective tissue grafts in postextraction implants with immediate restoration: A prospective controlled clinical study. *Pract Proced Aesthet Dent.* 2008; 20:337–343.
19. Kan JY, Rungcharasaeng K, Morimoto T, Lozada J. Facial gingival tissue stability following connective tissue graft with single immediate tooth replacement in the esthetic zone: Consecutive case report. *J Oral Maxillofac Surg* 2009; 67:40–48.
20. Chung S, Rungcharasaeng K, Kan JY, Roe P, Lozada JL. Immediate single tooth replacement with subepithelial connective tissue graft using platform switching implants: A case series. *J Oral Implantol* 2011; 37:559–569.
21. Tsuda H, Rungcharasaeng K, Kan JY, Roe P, Lozada JL, Zimmerman G. Peri-implant tissue response following connective tissue and bone grafting in conjunction with immediate single-tooth replacement in the esthetic zone: A case series. *Int J Oral Maxillofac Implants* 2011; 26:427–436.
22. Yoshino S, Kan JYK, Rungcharasaeng K, Roe P, Lozada JL. Effects of Connective Tissue Grafting on the Facial Gingival Level Following Single Immediate Implant Placement and Provisionalization in the Esthetic Zone: A 1-Year Randomized Controlled Prospective Study. *Int J Oral Maxillofac Implants.* 2014; 29(2):432–40.
23. Edelhoff DD, Beuer FF, Schweiger JJ, Brix OO, Stimmelmayr MM, Guth J-FJ. CAD/CAM-generated high-density polymer restorations for the pretreatment of complex cases: a case report. *Quintessence Int (Berl).* 2012 May 31; 43(6):457–67.
24. Rompen E, Raepsaet N, Domken O, Touati B, Van Dooren E. Soft tissue stability at the facial aspect of gingivally converging abutments in the esthetic zone: A pilot clinical study. *J Prosthet Dent.* 2007 Jun; 97(6):S119–25.
25. Redemagni M, Cremonesi S, Garlini G, Maiorana C. Soft tissue stability with immediate implants and concave abutments. *Eur J Esthet Dent* 2009; 4:328–337.
26. Abrahamson I, Berglundh T, Lindhe J. The mucosal barrier following abutment disconnection: An experimental study in dogs. *J Clin Periodontol* 1997; 24:568–572.
27. Cabello G, Rioboo M, Fabrega JG. Immediate placement and restoration of implants in the aesthetic zone with a trimodal approach: Soft tissue alterations and its relation to gingival biotype. *Clin Oral Implants Res* 2012



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