



Taiwan Academy of Osseo-integration TAOi
Taipei 22-23 July 2017


FUNDAMENTAL ESTHETIC PRINCIPLES REVISITED IN THE CONTEXT OF ANTERIOR MAXILLARY IMPLANT RESTORATIONS

A critical appraisal

Urs | Belser

TOPICS



- **Introduction and Scope**
- Concepts derived from conventional restorative dental medicine, including diagnostic mock-ups
- Selected elements of the 14-item esthetic checklist
- Conclusions & perspectives 

PROMOTE AND MAINTAIN...



... HEALTHY PERI-IMPLANT TISSUES

> *Make the Artificial Look Natural*



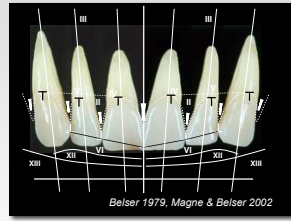
> *Create Optical Illusions*
(D. Garber)

Periimplant Tissue Health, No Open Embrasures,
Harmoniously Scalloped & Convex Soft Tissue Contours,
Balanced Relative Tooth Dimensions (Length To Width Ratio)



Periimplant Tissue Health, No Open Embrasures,
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Implant Esthetics...



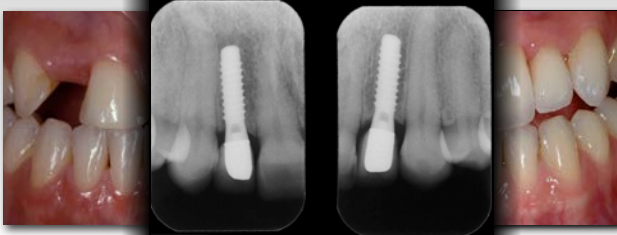
...reestablish harmonious soft tissue lines & relative tooth dimensions

Implant Esthetics...



...reestablish harmonious soft tissue lines & relative tooth dimensions

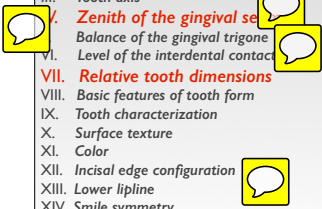
Implant Esthetics...



...reestablish harmonious soft tissue lines & relative tooth dimensions

Esthetic Checklist

- I. Gingival health
- II. **Interdental closure**
- III. Tooth axis
- IV. **Zenith of the gingival seal**
- V. Balance of the gingival trigone
- VI. Level of the interdental contact
- VII. **Relative tooth dimensions**
- VIII. Basic features of tooth form
- IX. Tooth characterization
- X. Surface texture
- XI. Color
- XII. Incisal edge configuration
- XIII. Lower lip line
- XIV. Smile symmetry









Dramatic Vertical Tissue Loss...



Two Desperate Attempts To Reestablish Harmony... 







Objectives: Re-establish **harmonious conditions**, i.e. healthy, regularly scalloped soft tissue contours with convex profile, no abrupt changes in vertical tissue height, absence of open embrasures ("black triangles"), balanced relative tooth dimensions







**ESTHETIC IMPLANT COMPLICATIONS:
INCIDENCE, ORIGIN, PREVENTION, TREATMENT ?**

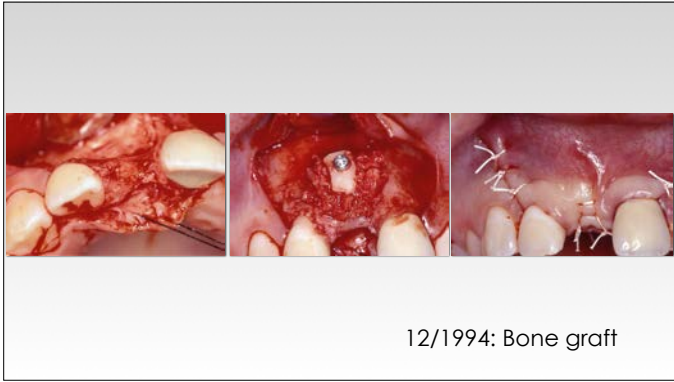
- > PREOPERATIVE RISK ASSESSMENT
- > COMPETENT DECISION-MAKING
- > CONCEPTUAL REASONING
- > METICULOUS EXECUTION



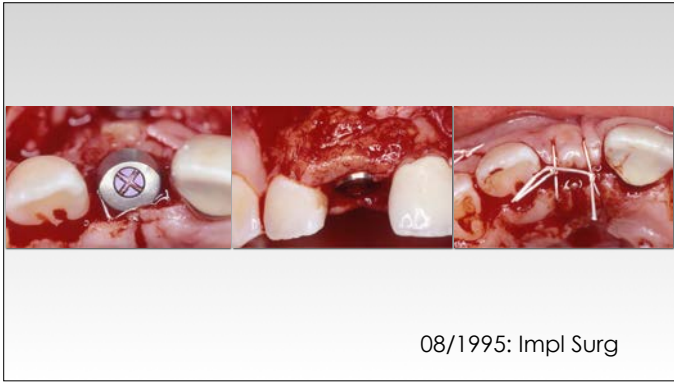
A little bit of history...

05/1996: Final restorations













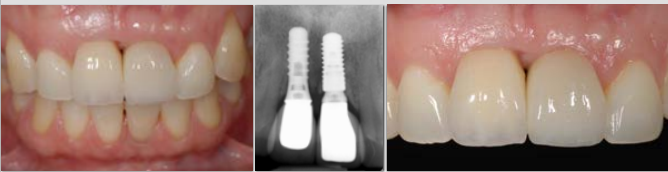
10/2001: 5-yr Follow-up



02/2017: 21-yr follow-up



02/2017: 21-yr follow-up



02/2017: 21-yr follow-up



05/1996: Baseline



02/2017: 21-yr follow-up



10/1992: BASELINE



02/1992: IMPL SURG



08/1992: IMPL IMPRESSIONS



10/1992: FINAL RESTORATIONS



03/1996: 4-YR FOLLOW-UP



09/2002: 10-YR FOLLOW-UP



"SELFIES" SENT BY THE PATIENT...:))





02/2017: 25-YR FOLLOW-UP



10/1992: BASELINE

02/2017: 25-YR FOLLOW-UP



10/1992: BASELINE

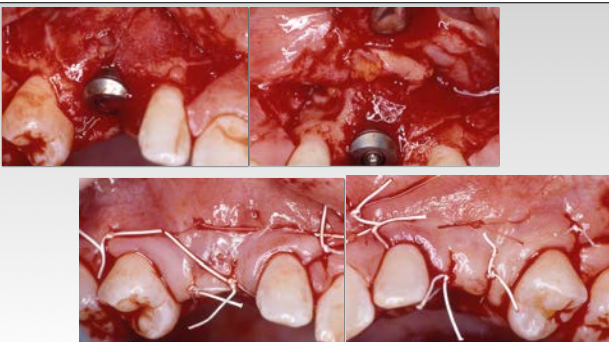
02/2017: 25-YR FOLLOW-UP



06/1999: Final restorations



10/1997: Baseline



04/1998: Implant surgery



04/1999: Final impressions



06/1999: Final restorations



02/2010: 11-yr follow-up



06/1999: Final restorations

02/2017: 18-yr follow-up



02/2017: 18-yr follow-up

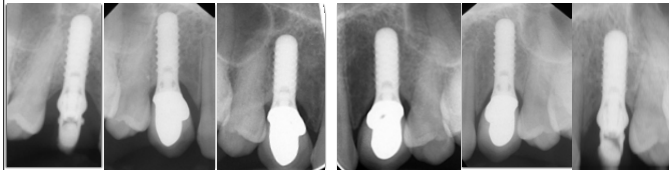


02/2017: 18-yr follow-up



06/1999: Final restorations

02/2017: 18-yr follow-up



02/99: Prov 06/99: Final 02/17: 18 yrs 02/17: 18 yrs 06/99: Final 02/99: Prov

Systematic reviews of randomized controlled trials
 Randomized controlled trials
 Systematic reviews of cohort studies
 Cohort studies or low quality randomized trials
 Individual case-control studies
 Case series
 Case reports
 Expert opinions

« Eminence-based »

NHS R&D, Center for Evidence-Based Medicine - 1998

Belser, Grütter, Vailati, Bornstein, Weber & Buser
 Outcome evaluation of maxillary anterior single tooth implants using objective esthetic criteria. A cross-sectional, retrospective study in 45 patients with a 2-4 year follow-up using pink and white esthetic scores (PES-WES). J Periodontol 80: 141-151, 2009

Pink **E**sthetic **S**core – **PES** **W**hite **E**sthetic **S**core – **WES**

THE JOURNAL OF PROSTHETIC DENTISTRY
JPD
 2017

SYSTEMATIC REVIEW

Clinician assessments and patient perspectives of single-tooth implant restorations in the esthetic zone of the maxilla: A systematic review

Sirikarn P, Anunyanak, DDS, MS,¹ Adrien Pollini, DDS,² Athanasios Ntounis, DDS, MS,¹ and Dean Morton, BDS, MS³

“What are the **quantitative and qualitative differences** between clinician evaluations and patient perspectives in the assessment of single-tooth implant outcomes in the **esthetic zone**?”

Search Medline and Cochrane databases from 2000 to 2014

Publications from electronic search (n=548)

Total titles retrieved for evaluation (n=535)

Abstracts retrieved for evaluation (n=252)

Full-text articles retrieved for detailed evaluation (n=140)

Publications included in this systematic review (n=11)

Clinicians are **more critical** of esthetic outcomes than patients.

| | Satisfactory outcome (%) |
|------------|--------------------------|
| Clinicians | 51-100 |
| Patients | 43-93 |

The Pink Esthetic Score (PES) and the Papilla Index (PI) **correlated** with the patients' responses concerning the **periimplant soft tissue**.

The visual analog scale score of the dentists was **always lower** than that of the patients.


Clinicians should be familiar with and **consider esthetic factors of esthetic relevance to the patient** as these vary from those of clinicians.

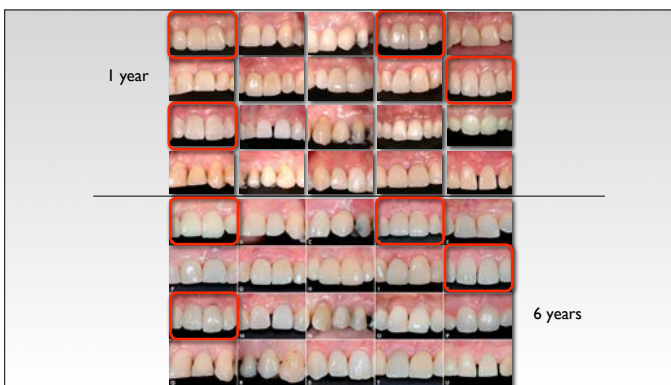
Buser D, Chappuis V, Kuchler U, Bornstein MM, Wittneben JC, Buser R, Cavusoglu Y, Belser UC: **Long-term Stability of Early Implant Placement with Contour Augmentation.** *J Dent Res* 92: 176S-182S, 2013

Material & Methods

- Prospective examination of 20 patients with a single tooth replacement post extraction in the esthetic zone
- **Concept of early implant placement with simultaneous contour augmentation**
- Clinical examinations at 1-, 3- and 6 years
 - ✓ Typical peri-implant soft tissue parameters
 - ✓ Bone crest level (DIB)
 - ✓ PES-WES analysis
 - ✓ Cast measurements for crown length (IC & TC)
 - ✓ 4x4 cm Cone Beam Computed Tomographies (Accutomo, Morita) for the measurement of the facial bone wall thickness

> No incidence of facial tissue recessions





Anterior maxillary implants in the light of ongoing dento-alveolar growth

The phenomenon is mostly **small in size** and appears in **less than 10%** of the patients. It is associated to the **long-face** cephalometric morphotype, and concerns esthetically primarily **central incisor implants**

Conceptual strategies and patient communication:

- implants will most likely stay **successful for decades**
- however, implant supra-structures may need **modification/ replacement** after some years
- favor directly **screw-retained** implant restorations
- **postpone** implant therapy, if reasonable alternatives are available, such as e.g. bonded restorations

Additional clinical studies based on larger patient populations are needed to refine treatment concepts

Chappuis V, Rahman L, Buser R, Janner S, Belser UC, Buser D
10-year Stability of Early Implant Placement with Contour Augmentation in Esthetic Single Tooth Sites (data analyzed)



10-year follow-up

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Initial situation



Wax-up -> Diagnostic Mock-up



Diagnostic Mock-Up



Initial situation

Diagnostic Mock-up



Initial situation

Diagnostic Mock-up



Initial situation

Diagnostic Mock-up



Diagnostic Mock-up



Diagnostic Mock-up





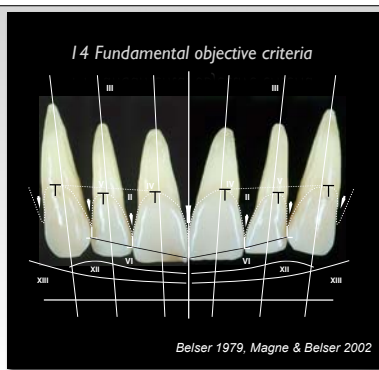
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Avg. Crown HEIGHT

Avg. Crown WIDTH

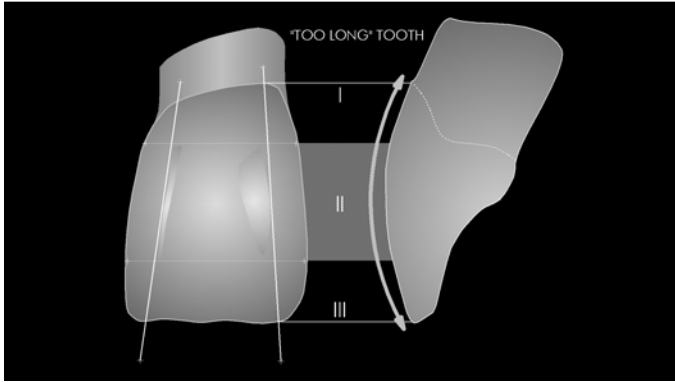
| | | | | | |
|------|------|------|----------|-----|-----|
| | | | | | |
| 10.1 | 8.7 | 10.2 | Men* 8.6 | 6.6 | 7.6 |
| 8.9 | 7.8 | 9.4 | Wom* 8.1 | 6.1 | 7.1 |
| | | | Ref. 9.0 | 6.0 | 7.5 |
| 11.3 | 10.0 | 11.0 | Real 9.0 | 6.7 | 7.6 |

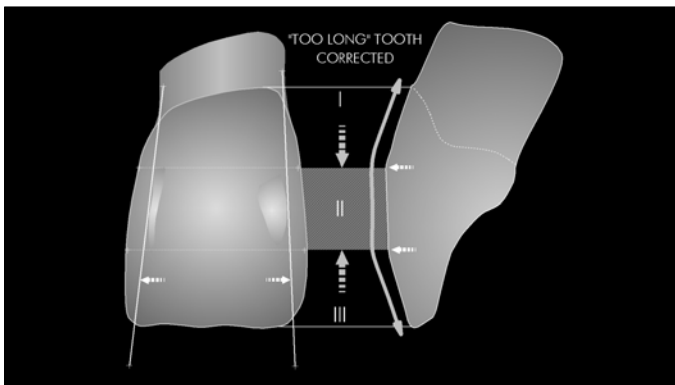
*STERRET JD et al. Width/length ratios of normal clinical crowns of the maxillary anterior dentition in man.

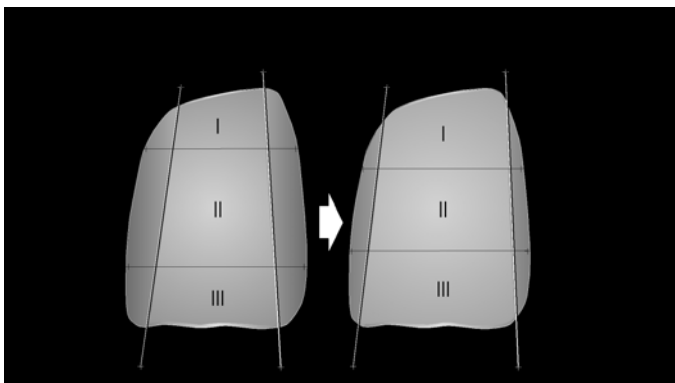
WIDTH / HEIGHT ratios

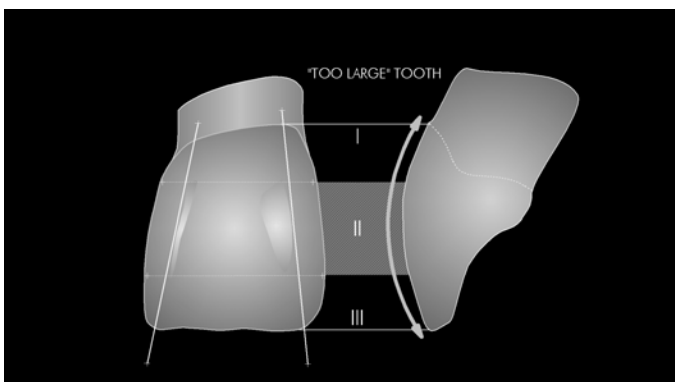


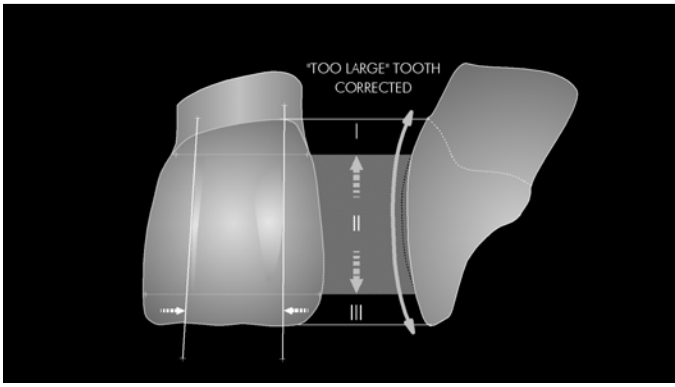
*Sterrett JD, Oliver T, Robinson F, Fortson W, Knaak B, Russell CM. Width/length ratios of normal clinical crowns of the maxillary anterior dentition in man. J Clin Periodontol 1999;26:153-157

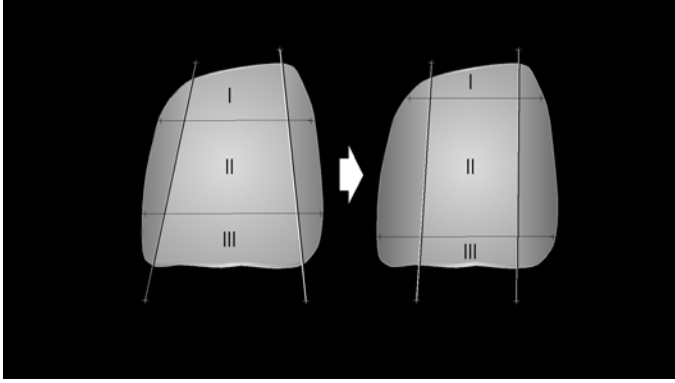


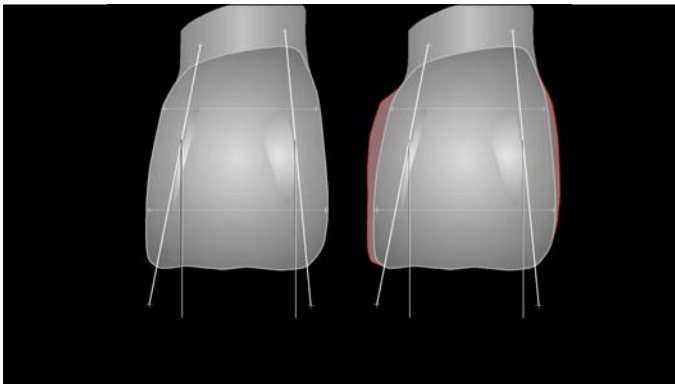

















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V I S U A L T E N S I O N





KUPENLOFF CR. Fundamentals of esthetics. Berlin Quintessenz, 2002-04, 192

C O H E S I V E F O R C E S



KUPENLOFF CR. Fundamentals of esthetics. Berlin Quintessenz, 2002-04, 192



Cohesive forces... 

14 Fundamental objective criteria

- I. Gingival health
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